AMERICAN SCHOOL AND UNIVERSITY

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VOLUME I
SCHOOL PLANT REFERENCE

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About this two volume edition

The 28th consecutive edition of the AMERICAN SCHOOL AND UNIVERSITY reference yearbook continues our endeavor to present the best available current thinking, practice, research and product information on the educational plant. This year, for the first time, it is issued in two volumes. Volume I contains many materials of importance on the planning, designing, equipping, maintenance and operation of educational buildings. Volume II contains an organized file of current catalogs on building products, furniture, equipment and supplies. Together with the preceding volumes, this edition forms an ever ready reference guide, offering immeasurable assistance to school planners. I suggest that you keep these yearbooks together in one place to enjoy their full usefulness as a complete reference work.

Walter D. Cocking, Editor

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VOLUME I
SCHOOL PLANT REFERENCE

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EDITORIAL INDEX BY SUBJECT CLASSIFICATION

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DECORATION AND COLOR

DORMITORIES

EQUIPMENT AND SUPPLIES

FINANCE

Sixty-four percent of all new public school buildings constructed during 1955 were elementary schools. One of the 5,004 new elementary schools constructed is the Florentine Hendrick Elementary School in Wolcott, New York. The architects are Thomas Lyon White and F. Kirk Helm of Geneva, New York.

EDUCATIONAL BUILDING IN 1955

by THE EDITORS

AMERICAN SCHOOL AND UNIVERSITY

THE seventh annual educational building survey conducted by the AMERICAN SCHOOL AND UNIVERSITY reveals that the people of the United States constructed more school buildings and spent more money doing it than ever before. Such findings appear to be encouraging in view of recent national reports on classroom shortages and increasing enrollments at all levels of American education.

In gathering these data, 13,475 inquiries were sent to school officials in public and private schools, junior colleges, colleges and universities in the forty-eight states. Educational building totals were projected on the basis of 7,767 returns.

All Educational Building

Expenditures for all school building during 1955 exceeded 3.028 billion dollars. This was nearly 175 million dollars more than was spent in 1954.

The total number of school buildings constructed in 1955 was 9,246. Included in this number were 4,027 major additions to existing school plants, representing 44 percent of all new educational construction.

The Middle Atlantic and Central states accounted for 30 percent and 28 percent, respectively, of the total expenditures. For the Middle Atlantic states this figure represented 910 million dollars for school construction costs, nearly 150 million dollars more than in 1954.

Expenditures for all school building in New England and the West in 1955 were less (by approximately 38 million dollars) than for the previous year.

Public School Building

In 1955, 2.44 billion dollars, representing 80 percent of the costs of all educational construction, were

All Educational Building
(Public, Private, Junior College, College)

Number of Buildings by Region

Region	1953		1954		1955	
	Number	Percent	Number	Percent	Number	Percent
South	2543	33%	2737	30%	3016	33%
New England	391	5	412	4	354	4
Central	2391	32	3020	33	2750	30
Middle Atlantic	726	10	1171	13	1251	13
West	1509	20	1807	20	1875	20
TOTAL	7560	100%	9147	100%	9246	100%

All Educational Building
(Public, Private, Junior College, College)

Cost of Buildings by Region

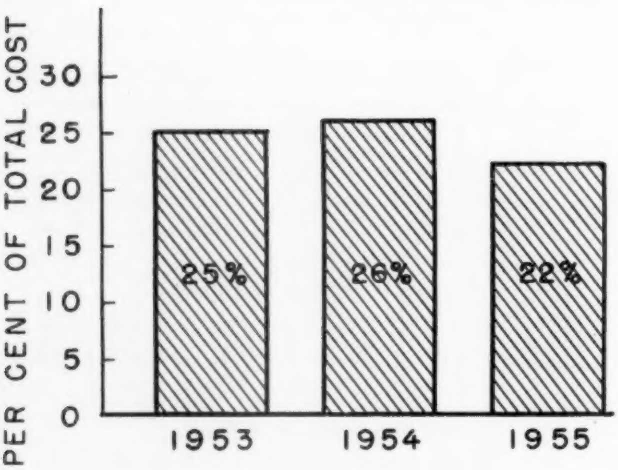
Region	1953		1954		1955	
	Amount	Percent	Amount	Percent	Amount	Percent
South	$ 507,879,029	23%	$ 580,818,231	20%	$ 617,752,236	20%
New England	154,215,434	7	168,033,537	6	138,345,513	5
Central	706,310,416	31	816,369,866	29	841,968,304	28
Middle Atlantic	428,322,985	19	761,353,851	27	910,004,876	30
West	453,662,387	20	528,181,074	18	520,271,648	17
TOTAL	$2,250,390,251	100%	$2,854,756,559	100%	$3,028,342,577	100%

spent by 4,141 public school systems to construct 7,836 new buildings. Of this expenditure 61 percent—1.49 billion dollars—was spent in the eighteen states of the Middle Atlantic and Central regions for the construction of 3,437 buildings.

The South led in the number of public school buildings constructed with 2,604 (33 percent), though expenditures were only 20 percent of the public school construction costs.

The New England and Central states spent approximately 58 million dollars less for public school construction in 1955 than in 1954. For the same period, the Middle Atlantic region increased expenditures by more than 180 million dollars.

Chart shows the percent of total cost of all educational building which was spent for major additions.



Of all public elementary and secondary school buildings constructed in 1955, 64 percent were elementary schools, 25 percent were secondary schools and 11 percent were combination elementary and secondary school buildings.

Although two-and-a-half times as many public elementary school buildings were constructed as compared to secondary schools (5,004 elementary; 1,978 secondary), construction costs were approximately the same. Both expenditures separately exceeded one billion dollars; each was larger than the amount spent by the nation for all public school building in 1949.

Private School Building

For the first time since 1952 private school building decreased both in the number of buildings and in total cost. One hundred and seventy-seven school systems (approximately 20 percent of the systems) completed 371 buildings in 1955, at a cost of 61 million dollars, 2 percent of the cost of all educational building.

Public School Building
Number of Buildings by Type of School

Type of School	1953		1954		1955	
	Number	Percent	Number	Percent	Number	Percent
Elementary	4100	64%	5245	69%	5004	64%
Secondary	1598	25	1496	20	1978	25
Combination	730	11	826	11	854	11
TOTAL	6428	100%	7567	100%	7836	100%

Public School Building — Cost of Buildings by Region

Region	1953		1954		1955	
	Amount	Percent	Amount	Percent	Amount	Percent
South	$ 390,058,424	21%	$ 460,903,616	20%	$ 483,959,212	20%
New England	129,634,563	7	135,209,341	6	93,747,530	4
Central	535,241,718	29	698,936,890	31	682,761,807	28
Middle Atlantic	379,082,610	21	627,842,663	28	808,968,649	33
West	396,283,940	22	341,484,073	15	370,604,510	15
TOTAL	$1,830,301,255	100%	$2,264,376,583	100%	$2,440,041,708	100%

Public School Building — Cost by Type of School

Type of School	1953		1954		1955	
	Amount	Percent	Amount	Percent	Amount	Percent
Elementary	$ 957,280,614	52%	$1,136,006,946	50%	$1,131,111,021	46%
Secondary	681,236,297	37	783,197,660	35	1,118,180,890	46
Combination	191,784,344	11	345,171,977	15	190,749,797	8
TOTAL	$1,830,301,255	100%	$2,264,376,583	100%	$2,440,041,708	100%

Public School Building
Number of Buildings by Region

Region	1953		1954		1955	
	Number	Percent	Number	Percent	Number	Percent
South	2154	33%	2253	29%	2604	33%
New England	303	5	280	4	238	3
Central	2053	32	2627	35	2427	31
Middle Atlantic	614	10	884	12	1010	13
West	1304	20	1523	20	1557	20
TOTAL	6428	100%	7567	100%	7836	100%

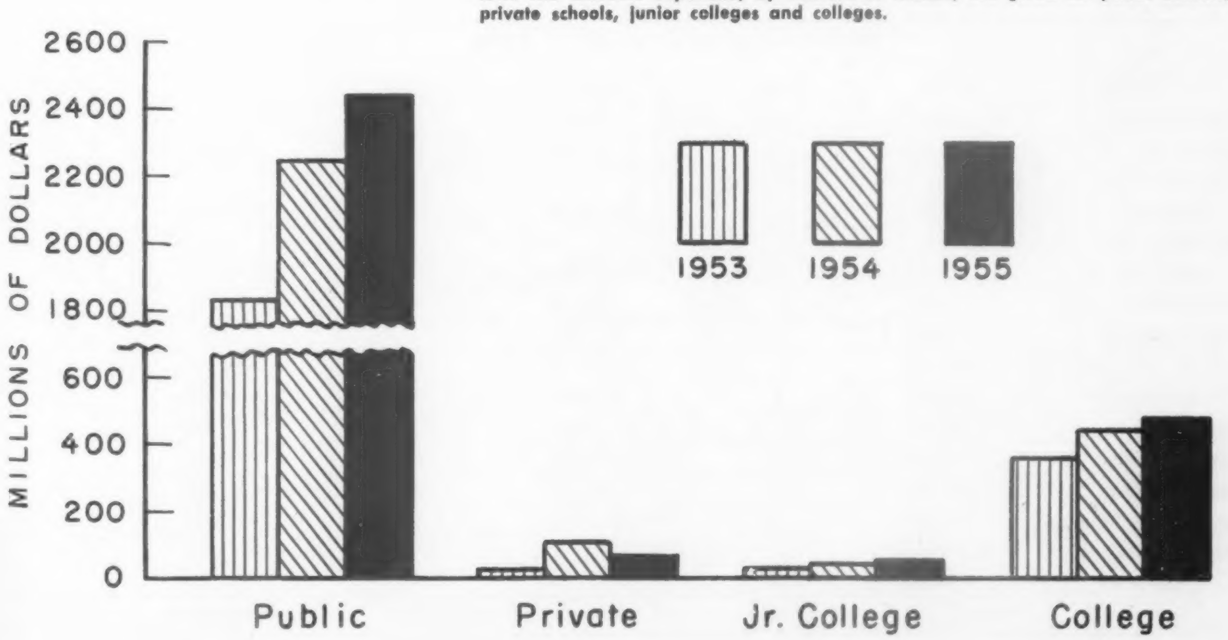
Private School Building
Number of Buildings by Region

Region	1953		1954		1955	
	Number	Percent	Number	Percent	Number	Percent
South	35	19%	197	29%	56	15%
New England	26	14	65	9	27	7
Central	72	39	192	28	105	28
Middle Atlantic	28	15	161	23	83	23
West	24	13	72	11	100	27
TOTAL	185	100%	687	100%	371	100%

Private School Building — Cost of Buildings by Region

Region	1953		1954		1955	
	Amount	Percent	Amount	Percent	Amount	Percent
South	$ 4,091,668	13%	$28,397,065	26%	$ 9,552,692	16%
New England	6,609,616	21	11,488,192	11	2,140,899	3
Central	13,848,720	44	25,549,445	23	22,403,879	37
Middle Atlantic	5,980,129	19	30,417,008	28	19,963,405	33
West	944,231	3	13,128,830	12	6,946,639	11
TOTAL	$31,474,364	100%	$108,980,540	100%	$61,007,514	100%

The cost for all educational building by type of school is shown in the chart below. The amounts expended, by millions of dollars, are given for public schools, private schools, junior colleges and colleges.



Junior College Building
Number of Buildings by Type

Type of Building	1953		1954		1955	
	Number	Percent	Number	Percent	Number	Percent
Administration	9	6%	5	3%	10	5%
Agriculture	4	3	3	2	2	1
Dormitory and Residence	55	35	28	17	30	13
Education and Liberal Arts	8	5	15	9	48	21
Engineering	1	1	3	2	4	2
Home Economics	4	3	3	2	5	2
Library	13	8	14	8	13	6
Physical Education	11	7	31	19	35	15
Science	5	3	16	9	29	13
Service Facilities	16	10	20	12	10	5
Student Center	13	8	8	5	5	2
Vocational — Commercial	5	3	11	7	30	13
Multi-Purpose and Miscellaneous	14	8	8	5	4	2
ALL TYPES	158	100%	165	100%	225	100%

Junior College Building
Number of Buildings by Region

Region	1953		1954		1955	
	Number	Percent	Number	Percent	Number	Percent
South	76	48%	46	28%	100	44%
New England	1	1	12	7	8	4
Central	27	17	24	14	36	16
Middle Atlantic	19	12	11	7	10	4
West	35	22	72	44	71	32
TOTAL	158	100%	165	100%	225	100%

Of this number, 191 were elementary schools, 156 were secondary schools and 24 were combinations.

The West is the only area where more private schools were built in 1955 (100) than in 1954 (72), although expenditures decreased by nearly 7 million.

Since 1953, the Central states have spent approximately 61 million dollars for private school construction, more than any other region for the same period.

Junior College Building

The volume of junior college construction continued to increase both in the number of buildings and total expenditures. One hundred and forty-five systems reported the construction of 225 buildings costing nearly 45 million dollars.

The South and Central regions were the only areas to show increases in the number of buildings constructed in 1955, as compared to 1954. Expenditures for education and liberal arts, science and physical education buildings comprised 63 percent of the total amount spent for all junior college buildings.

College and University Building

The nation's colleges and universities spent more than 482 million dollars in 1955 for the construction of 814 buildings. This was 86 more buildings than were constructed during the previous year.

Although this was the third consecutive year that expenditures have increased for college and university construction, the total amount was far below the 787 million dollars spent in 1950. In view of current estimates, which indicate large increases in the enrollments of these institutions during the next fifteen years, rising expenditures and construction rates appear likely.

Junior College Building — Cost of Buildings by Type

Type of Building	1953		1954		1955	
	Amount	Percent	Amount	Percent	Amount	Percent
Administration	$ 2,110,233	8%	$ 736,396	2%	$ 1,332,222	3%
Agriculture	326,335	1	522,134	1	385,422	1
Dormitory and Residence	6,997,781	24	3,720,659	11	4,267,815	10
Education and Liberal Arts	531,500	2	6,225,274	18	10,420,401	23
Engineering	1,800,000	6	303,799	1	828,772	2
Home Economics	208,000	1	123,799	1	823,822	2
Library	6,621,124	24	3,448,366	10	2,495,345	6
Physical Education	2,392,809	9	6,128,584	17	8,670,980	19
Science	460,000	2	7,382,764	21	8,705,889	19
Service Facilities	1,357,263	5	2,098,310	6	320,022	1
Student Center	1,716,088	6	1,095,569	3	795,209	2
Vocational — Commercial	687,014	2	1,874,485	5	4,583,814	10
Multi-Purpose and Miscellaneous	2,805,233	10	1,407,916	4	1,098,886	2
ALL TYPES	$28,013,380	100%	$35,068,055	100%	$44,778,599	100%

Junior College Building — Cost of Buildings by Region

Region	1953 Amount	1953 Percent	1954 Amount	1954 Percent	1955 Amount	1955 Percent
South	$ 5,936,635	21%	$ 6,893,665	20%	$14,660,189	33%
New England	11,000	1	676,299	2	1,036,722	2
Central	12,735,201	45	7,524,545	21	8,085,200	18
Middle Atlantic	4,805,335	17	1,909,730	5	4,425,596	10
West	4,525,209	16	18,063,816	52	16,570,892	37
TOTAL	$28,013,380	100%	$35,068,055	100%	$44,778,599	100%

The combined expenditure of the Central and Western states was 53 percent of the total amount spent on college and university building. These regions, and the South, spent over 100 million dollars each for this type of construction in 1955.

For the fourth consecutive year the South led all other regions in the number of new college and university buildings constructed (256). It was the third-ranking region in expenditures for 1955.

Number of Stories

One story buildings constituted 80 percent of all public school buildings constructed during 1955, as contrasted with 82 percent in 1954. Two and three

College Building — Cost of Buildings by Type

Type of Building	1953 Amount	1953 Percent	1954 Amount	1954 Percent	1955 Amount	1955 Percent
Administration	$ 41,969,802	12%	$ 9,537,089	2%	$ 8,787,644	2%
Agriculture	3,445,210	1	14,371,759	3	21,441,041	4
Architecture	—	—	1,396,337	1	2,278,518	1
Chapel — Auditorium	—	—	—	—	8,764,874	2
Dormitory and Residence	60,479,635	17	96,939,594	22	150,484,786	31
Education and Liberal Arts	21,410,529	6	26,432,052	6	51,573,215	10
Engineering	10,404,177	3	5,240,098	1	14,797,231	3
Home Economics	—	—	—	—	5,958,251	1
Law	—	—	2,116,552	1	2,078,518	1
Library	37,888,762	11	21,190,210	5	33,718,762	7
Medical	4,939,743	1	132,159,143	29	72,513,550	15
Physical Education	32,774,841	9	32,816,176	7	32,605,319	7
Science	40,023,637	11	59,176,066	13	41,021,738	8
Service Facilities	8,708,798	2	10,157,206	2	12,830,233	2
Student Center	24,576,477	7	22,829,698	5	18,300,570	4
Vocational — Commercial	7,291,093	2	2,687,381	1	3,405,988	1
Multi-Purpose and Miscellaneous	66,688,548	18	9,282,020	2	1,954,518	1
ALL TYPES	$360,601,252	100%	$446,331,381	100%	$482,514,756	100%

College Building — Cost of Buildings by Region

Region	1953 Amount	1953 Percent	1954 Amount	1954 Percent	1955 Amount	1955 Percent
South	$107,792,302	30%	$ 84,623,885	19%	$109,580,143	23%
New England	17,960,255	5	20,659,705	5	41,420,362	8
Central	144,484,777	40	84,358,986	19	128,717,418	27
Middle Atlantic	38,454,911	11	101,184,450	22	76,647,226	16
West	51,909,007	14	155,504,355	35	126,149,607	26
TOTAL	$360,601,252	100%	$446,331,381	100%	$482,514,756	100%

College Building
Number of Buildings by Region

Region	1953		1954		1955	
	Number	Percent	Number	Percent	Number	Percent
South	278	35%	241	33%	256	32%
New England	61	8	55	8	81	10
Central	239	30	177	24	182	22
Middle Atlantic	65	8	115	16	148	18
West	146	19	140	19	147	18
TOTAL	789	100%	728	100%	814	100%

story structures were, respectively, 17 percent and 3 percent of the total in 1955.

Of all public elementary schools, 85 percent were single story buildings, while 66 percent of public secondary schools were one story buildings. In the Western states 92 percent of all new public schools constructed were one story.

This overwhelming preponderance of single story schools has been evident in each annual study conducted by AMERICAN SCHOOL AND UNIVERSITY. In areas, other than large cities, where site costs are not major considerations, indications are that one story buildings are favored for several reasons; safety and economy being among the most important. Because of these and educational and aesthetic factors, public schools will continue to be predominately single story structures.

Building Sites—Public Schools

Building sites for public schools ranged in size from plots of less than one acre to plots of 200 acres. In general, the trend continued to be toward the acquisition of larger sites, as compared to previous years.

The article, "New High School Puts Its 70-Acre Site to Work," which appeared in *The School Executive*, September, 1955, describes several uses made of an existing large school site. In this instance, careful site selection and planning broadened immeasurably the scope of the high school program. (See also "What Size School Sites" by N. L. Engelhardt, in this volume, page 65.)

Examples such as this are increasing and indicate a growing awareness by school officials that school sites are an integral part of dynamic school programs.

Construction Costs and Price Trends

School construction and building costs reached an all-time high in 1955. In addition to the greater number of buildings constructed, these higher costs were largely responsible for pushing the total school construction bill for the American people beyond three billion dollars.

Labor costs in building rose steadily during 1955. Except for minor fluctuations this rise has been apparent for more than fifteen years. The general tendency has been for building material prices to increase also, although individual items vary occasionally.

As compared to a price index of 100 in 1939, the school building index at the end of 1955 was 214. The rise from 207 at the beginning of 1955 represented the largest increase in an annual period since 1950.

In contrast to 1954, when school bond interest rates declined, 1955 interest rates advanced from 2.4 percent to slightly more than 3.0 percent during the year. With the exception of 1951, this represents the largest increase in any year since 1945. Average school bond interest rates for 1955 were still low, however, when compared to the year 1927, when they averaged 4.48 percent.

Cost Comparisons of Buildings

Current increases in school construction and costs frequently lead to cost comparisons as a method of encouraging and publicizing economy, and insuring value received. Various yardsticks are used in comparing costs of school buildings—cost per square foot, per cubic foot, per classroom, per pupil, and so on.

Although common measuring devices are used and similar buildings are compared, many variables exist. The quality of materials, site differences, roof overhangs, the date of construction and class of construction are but a few. In some instances, the prosperity of the contractor may be involved since a low bid may

College Building
Number of Buildings by Type

Type of Building	1953		1954		1955	
	Number	Percent	Number	Percent	Number	Percent
Administration	88	11%	28	4%	15	2%
Agriculture	20	3	44	6	35	4
Architecture	—	—	3	1	4	1
Chapel — Auditorium	—	—	—	—	20	2
Dormitory and Residence	175	21	234	32	290	36
Education and Liberal Arts	69	9	64	9	98	12
Engineering	21	3	10	1	18	2
Home Economics	—	—	—	—	13	1
Law	—	—	5	1	4	1
Library	58	7	53	7	52	6
Medical	5	1	28	4	29	4
Physical Education	60	8	63	9	64	8
Science	74	9	98	13	66	8
Service Facilities	47	6	34	4	53	7
Student Center	63	8	43	6	32	4
Vocational — Commercial	19	3	5	1	13	1
Multi-Purpose and Miscellaneous	90	11	16	2	8	1
ALL TYPES	789	100%	728	100%	814	100%

occasionally be necessary during a period when business is slack.

The major point seems to be that cost comparisons are likely to be inaccurate and, consequently, misleading. As a general rule, an awareness of the complications involved should lead a person to be cautious in making or reading cost comparisons of school buildings. There is no substitute for painstaking research when attempting to compare school construction costs.

Educational Planning for New Buildings

A recent survey conducted by the Research Department of *The School Executive* indicated that many different people and groups within communities become involved in educational planning for new public school buildings. In numerous situations school officials, board members, architects, citizen committees, students and educational consultants have united their efforts to plan for school buildings.

The trend to involve more people in attacking building problems continues to grow. At the same time, more emphasis is being placed on local efforts to develop "educational specifications" in contrast to the dependence on professional personnel from outside.

As revealed in the survey, varying amounts of time are spent in educational planning. Superintendents indicated, generally, that a minimum of one year should be devoted to the process of planning for new school buildings.

Cooperative and careful planning in 1955 resulted in fewer schools with the "institution-look." Such planning reflects an increasing awareness of the need for providing educational spaces for people and programs, rather than fitting people and programs to predetermined spaces.

Some Technical Developments

Research and experimentation characterized the year 1955 in relation to many technical factors in school construction. Advances made in lighting, ventilation, heating, the use of materials and other features were encouraging even though completely new developments were not evident.

As in years past, school lighting and its effects on visual comfort and efficiency received major attention from lighting specialists. Improvements were noted in top lighting, in the control of glare and in the use of glass blocks and window glass. (See "Top Lighting Is Here to Stay" by Donald Barthelme, this volume, page 193.)

Glass came to be used more frequently in school construction, particularly for classroom and corridor walls. In at least one instance, a glass gymnasium provided a fresh approach to some of the problems inherent in more conventional physical education facilities. (See Research Report #10, this volume, page 443.)

There were continued efforts in 1955 to build schools which would allow more flexibility in school programs. Refinements continued to appear in modular construction of buildings, as well as equipment, and the "partitionless school" presented implications considered worthwhile by many leading educators and architects. (See "The Partitionless School in Chelsea, Michigan," this volume, page 119.)

Air conditioning in college and university buildings became more common in 1955. While still in limited use in public and private elementary and secondary schools, air conditioning is more prevalent in new college buildings. In general, high costs constituted one of the chief drawbacks to a wider acceptance of air conditioning for schools in 1955.

Attempts to improve the technical aspects of school buildings were numerous. In large measure, each was motivated by a desire to achieve greater safety, economy and comfort. Substantial progress was made to provide more desirable school plant environments for the learners of America.

The use of space dividers in classrooms has been

Joseph W. Molitor

Seventeen percent of all new public schools constructed in 1955 were two stories in height. One of these is the Carlisle, Pennsylvania, High School designed by Hunter, Caldwell & Campbell, architects of Altoona.

increasing for several years. In 1955, movable partitions of chalkboard, tackboard, bookshelves and cabinets were used more extensively as one of the chief means for achieving flexibility within teaching spaces.

There was evidence that storage cabinets were integrated more carefully into classroom design. During the year at least two manufacturers of heating units were marketing cabinets that matched their units in order to achieve an integrated wall.

A growing number of high schools were constructed without lockers for students' clothes. In most cases, open racks proved to be satisfactory for hanging coats and sweaters. (See "Student Lockers for Secondary Schools," this volume, page 335.)

As in other years, science facilities for junior and senior high school students received major attention from educational planners and manufacturers. Perimeter equipment for science rooms was used more widely, thus allowing more freedom for science activities in the center of the teaching space. (See "How to Achieve Outstanding High School Science Facilities" by Paul deH. Hurd, this volume, page 317.)

Other aspects, such as stackable desk and chair units, more extensive uses for plywood and plastics and tackboard from floor to ceiling, gained wider acceptance during 1955. In various ways they represented substantial investments for better schools.

A Few Problems In 1955

One of the major problem areas in American education continued to be concerned with the financing of schools. It was not a matter of having enough wealth. The gross national product was estimated at approximately 400 billion dollars. Rather, "How Can We Finance Our Schools—Build and Operate Them?" proved to be a complex and much debated question extending beyond the White House Conference. From Maine to California, and related to all levels of education, this topic was frequently in the minds of lay and professional people.

Classroom shortages loomed large in 1955. The most reliable estimates indicated that even in a record year of construction, the nation did not make a substantial gain in providing the classrooms and other facilities necessary to overcome existing shortages.

For some people, prefabrication of schools and stock plans offered solutions; some thought in terms of custom school construction. There were many people who looked to prefabricated parts as being helpful. Those Americans who were interested in school plant problems were dealing with these issues. People who have studied these problems carefully, indicate that there are no easy answers.

Elementary and secondary schools found no let-up from the pressures of increasing enrollments. For several years they have been constantly concerned with building needs. The year 1955 provided a clear presage of what is to come as the deluge of students continues to roll toward higher educational institutions. College and university leaders are coming closer to realizing the immediate urgency of enrollment and building problems. Thus far, however, no national organization has assumed the leadership in dealing with college and university school plant problems.

The Days Ahead

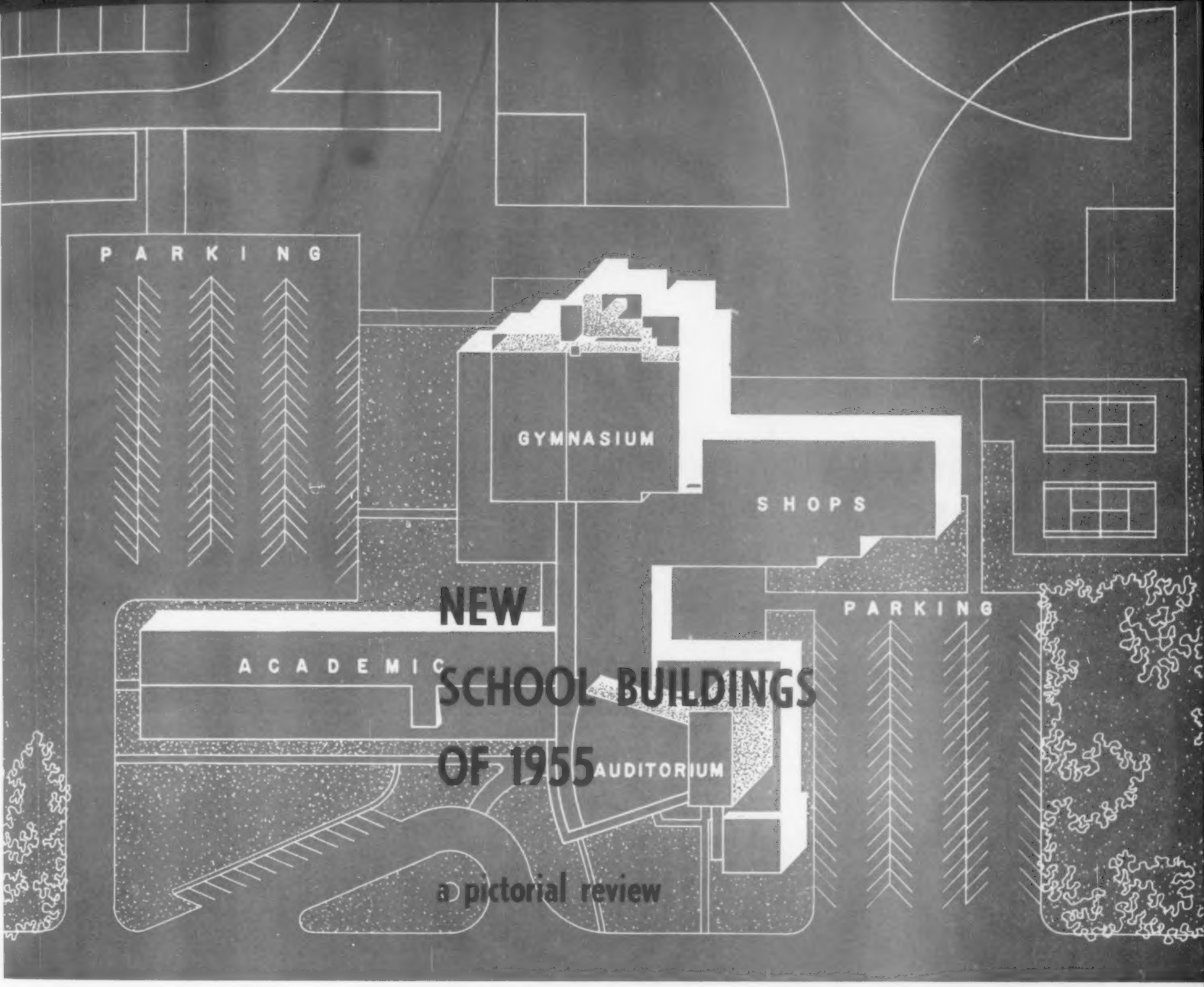
In 1955 America's educational enterprise reached unprecedented levels. New highs were recorded in construction; total enrollment in all schools climbed to 40 million; there were 1.5 million teachers and other employees engaged in educational activities. In all, Americans spent 12 billion dollars in the interests of education.

Figures relating to over-all developments in education have mounted rapidly in recent years, and no decline is foreseeable in the near future. Increasing demands will continue to be placed on the educational system; more and better services will be sought for greater numbers of people at all levels of education.

In the days ahead, new and better school plants must be provided. They cannot be disassociated from the dynamic system of American education. The challenge to provide decent educational facilities for adults, as well as children and youth, must be accepted and met with the characteristic vigor of the American people.

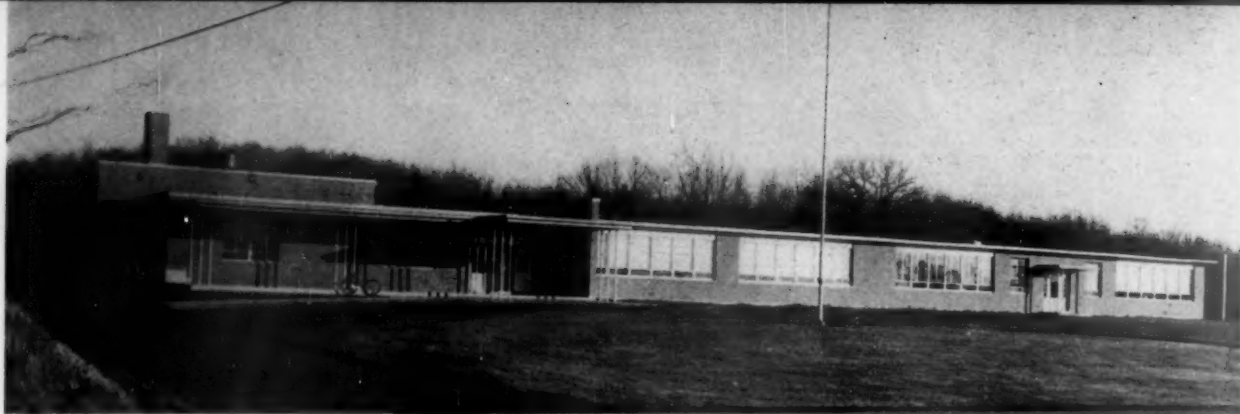
NEW SCHOOL BUILDINGS OF 1955

a pictorial review



IN the unprecedented surge of activity which has engulfed the school districts of our nation as they hasten to erect new school buildings for growing enrollments, let us pause to consider some of these new buildings, their design and how they were constructed. On the following pages AMERICAN SCHOOL AND UNIVERSITY presents a pictorial review of 33 new school buildings which were constructed during the past year.

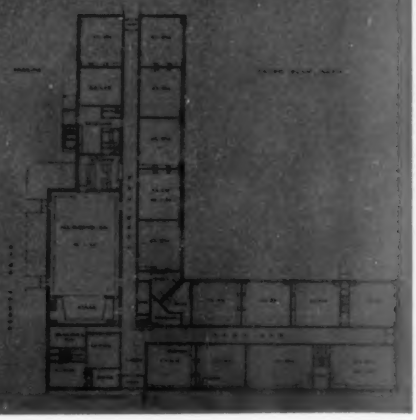
These schools include 13 elementary buildings, 13 secondary schools, 2 combination buildings and 5 college buildings. The achievements of school districts and architects in 19 different states are presented. From California to Connecticut and from Wisconsin to Florida, these 33 school designs represent our contemporary American school architecture. They are products of the present and their designs may hold the key to our future successes in school design.



The Shaws

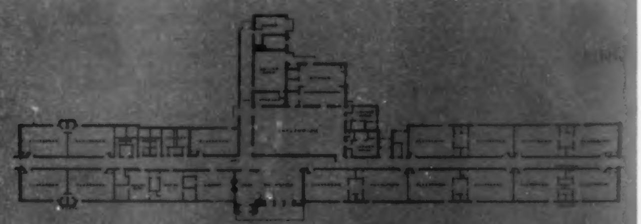
ELEMENTARY SCHOOLS

For grades 1-6, the Buttonball Lane School, Glastonbury, Conn., has 14 classrooms, a kitchen and general purpose room. The plan is at right. The architect is Keith Sellers Heine.



The 13-classroom, 1-kindergarten Northwest School in Newington, Conn., can eventually be expanded to ten additional classrooms. Floor plan at left shows the school as planned by architects Moore and Salsbury of West Hartford.

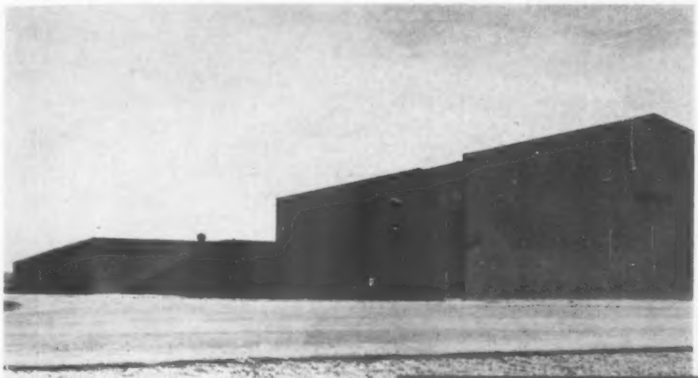
Alfred A. DeLardi



Classrooms in the West Park Place Elementary School, Newark, Delaware, are arranged in pairs with toilet facilities between each two classrooms. The bus loading room and lobby can be combined by opening folding partitions to form a community or assembly room. The architects are the Office of F. William Martin, with Donald S. Wason, associate.

The Fayette Township Consolidated School, New Goshen, Ind., is a country school and all children arrive in buses. The exterior is local brick with aluminum sash. Miller-Vrydagh-Miller of Terre Haute, Ind., are the architects.

Leo Deming Studio



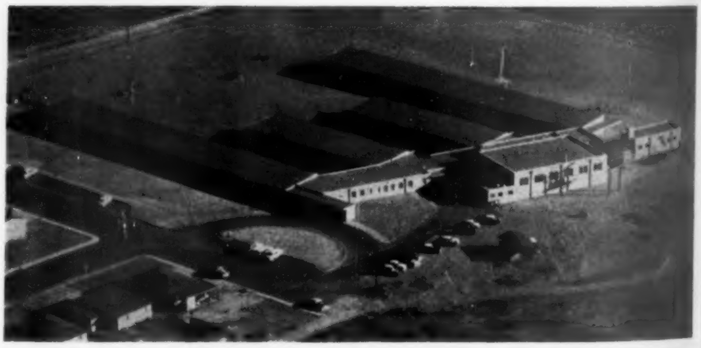
The Plaza Park School, for grades 1-8, in Evansville, Indiana, is built of steel fire resistant construction. The masonry walls are of light-weight blocks, with a veneer of face blocks. The roof has steel beams with poured gypsum. The roof deck is covered with tar and the roof is gravel built-up. The building has automatic temperature control throughout. Ralph Legeman is the architect.

The Coal City Community Consolidated School has 16 classrooms, an all-purpose gym and a kitchen. Fourteen classrooms are served, in pairs, by "mudrooms" which are wardrobe rooms with exterior doors. The building exterior is red face brick. William J. Connor and Associates are the architects of this Illinois school.

Auble Studio

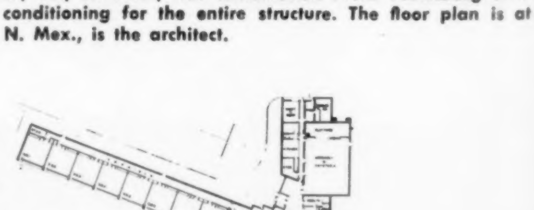
Located on a ten-acre tract in Gallup, New Mexico, the Jefferson Elementary School has 14 classrooms, an all-purpose room, an office and lobby space. Floor plan is at left. Plastic domes light the hallways and light diffusing glass is used in all outside windows. Welgamood & Millington, architects.

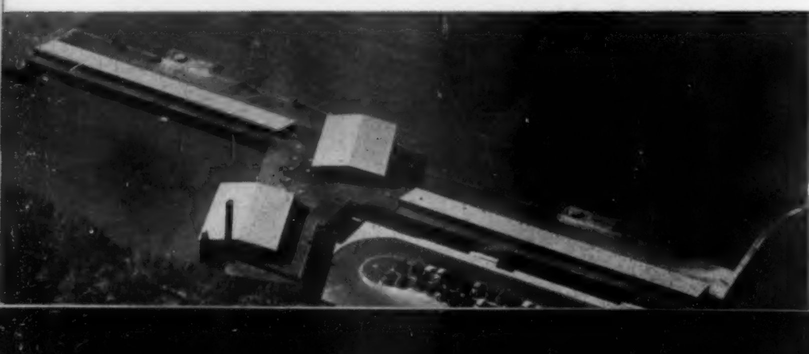
To reduce costs to a minimum, the Paumanok Grade School, West Islip, Long Island, N. Y., was designed with a slab on grade and a light steel modular framing throughout. Exterior walls are face brick with concrete block backing. Frederic P. Wiedersum Associates, Valley Stream, N. Y., are the architects.



The South Jal Elementary School, Jal, N. Mex., has combination room ventilating units which provide mechanical air conditioning for the entire structure. The floor plan is at left. George R. Graves, Hobbs, N. Mex., is the architect.

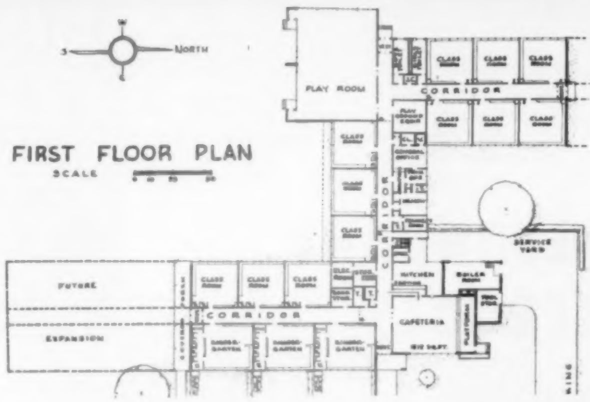
The two basic classroom wings of the Mapleshade School, East Longmeadow, Mass., spread out from the central core of administration, cafetorium and playroom. Classrooms are paired to share exhibition areas. Alderman & MacNeish, architects and engineers.

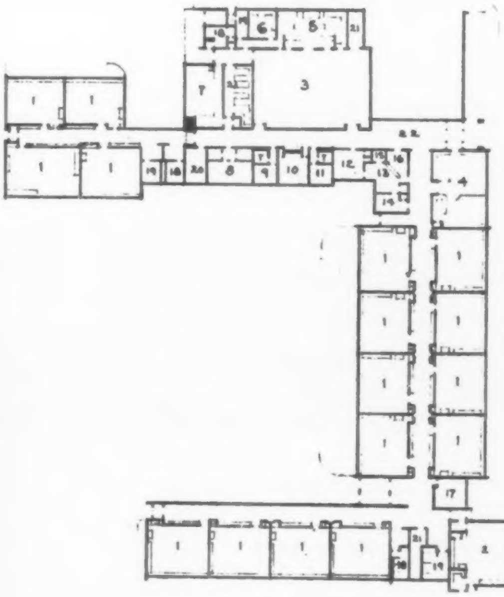




Neil Doherty Photo

Architects Thomas Lyon White and F. Kirk Helm developed the Florentine Hendrick Elementary School, Wolcott, N. Y., to achieve an intimate and residential character in a scale for younger children. (Plan is at right.) The 15-classroom school has a capacity of 450 pupils.





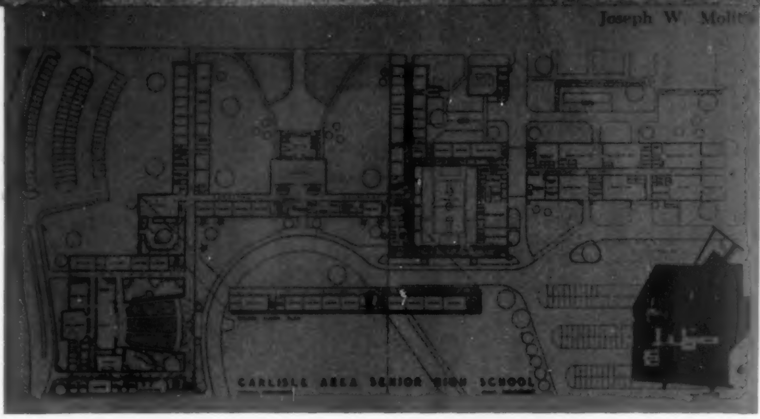
Laurence E. Tilley

The exterior of the Jamestown, R. I., Elementary School (floor plan at left) is red brick with white wood trim, pale blue lally columns and bright red doors. MacConnell and Walker of Apponaug are the architects.

ELEMENTARY SCHOOLS

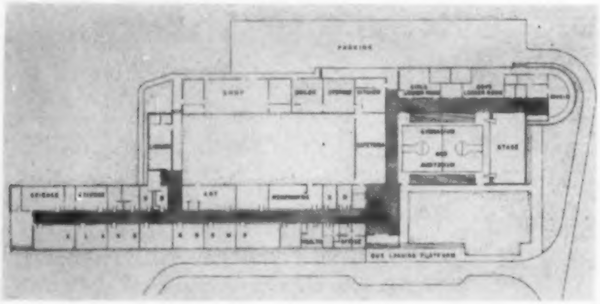
This new elementary school for Goldthwaite, Texas, is located on a 75-acre tract of land. The building has 16,587 square feet of floor space. The architect is N. E. Wiedemann of Waco, Texas.

Joseph W. Molit

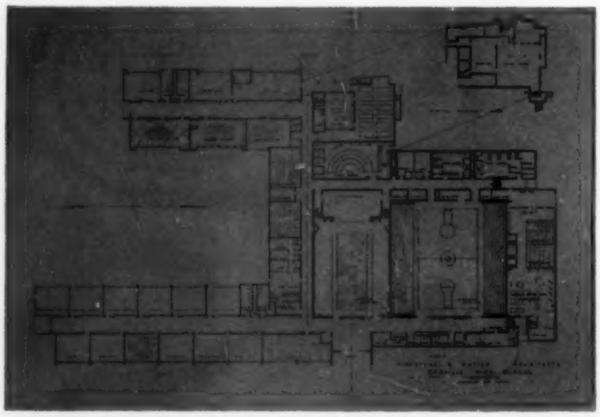


Combining campus and finger plan designs, Carlisle High School, Pennsylvania, is predominantly one story with a two story section containing areas of greatest community use. Separate wings for classrooms and special areas and a separate shop building are the design of Hunter, Caldwell and Campbell, architects of Altoona, Pennsylvania.

SECONDARY SCHOOLS

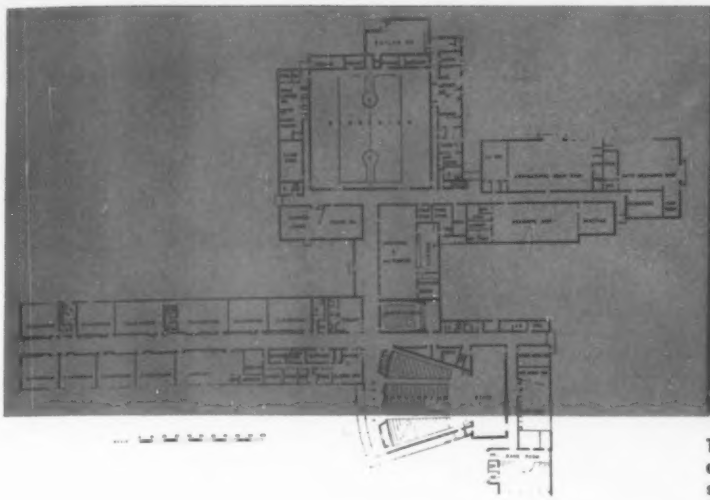


Space and structural design by Edmund George Good, Jr., architect of Harrisburg, Pa., provides for future addition of an auditorium as well as 100% classroom expansion at Fannett-Metal High School, Willow Hill, Pa.



Orrville High School, Ohio, is a one story structure of cream brick and glass block construction. Designed by Firestone and Motter, architects of Canton, the school is situated on a thirty-two acre site.

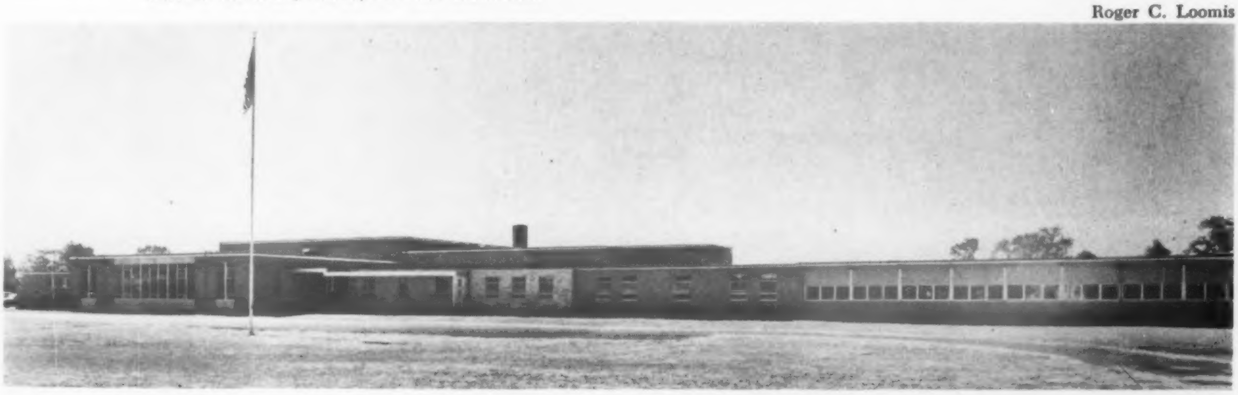
Hal Rumel



The site for Uintah High School, Vernal, Utah, is approximately 22 acres, located in a residential section. Architect Lorenzo S. Young of Salt Lake City planned the building and its facilities.

East Windsor High School, Conn., is a one story building housing grades 7-12 and consisting of 15 classrooms and 12 special rooms. Olson, Miller and Associates of Hartford, Conn., are the architects.

Roger C. Loomis

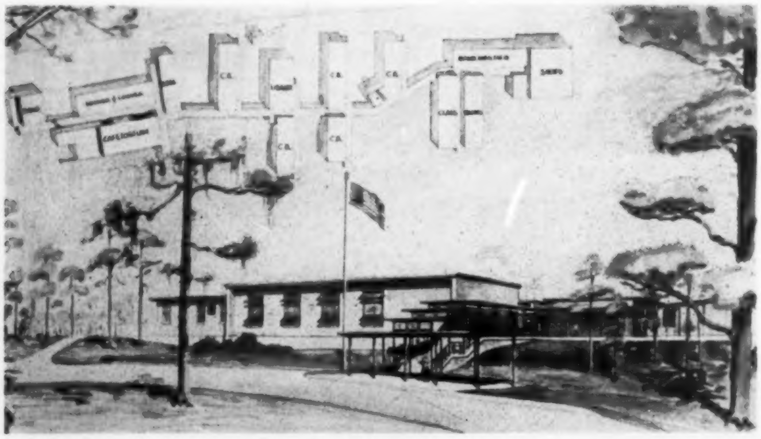


Located on a 20-acre plot at the edge of the community, Carlyle, Illinois, Community High School was planned with ease of maintenance and low upkeep in mind. Exterior of the building is attractively landscaped and the interior is decorated with cheerful colors throughout. Berger-Kelley and Associates, architects.

Pittsfield High School, Illinois, was constructed entirely of steel, concrete and masonry. Classrooms and shop portions have a steel framework covered with brick and continuous windows on the outside walls. The interiors have acoustically treated ceilings. D. C. Wilson, architect.

Situated on a twenty-acre tract, Lindsborg Rural High School, Kansas, is 650 feet long and is of brick exterior and haydite block and tile interior. Steel columns and beams are used throughout the building. Architects are Thomas-Harris-Calvin and Associates of Wichita, Kansas.

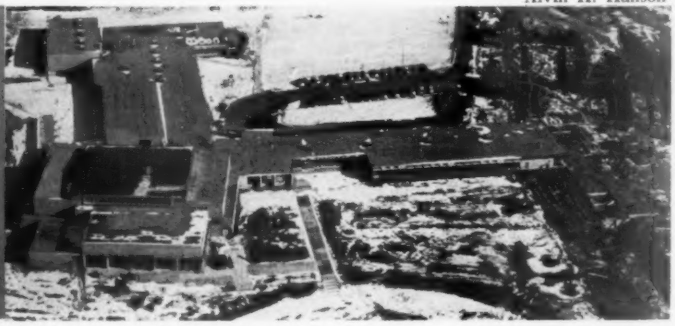
SECONDARY SCHOOLS

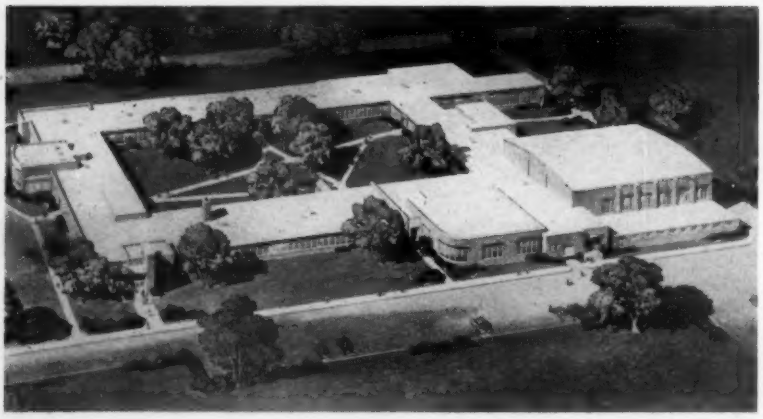


Mulberry High School, Florida, is located on a sixty-acre site which was donated by Virginia-Carolina Chemical Corp. The finger-type plan with single loaded corridors was designed by W. B. and Thomas V. Talley, architects of Lakeland, Florida.

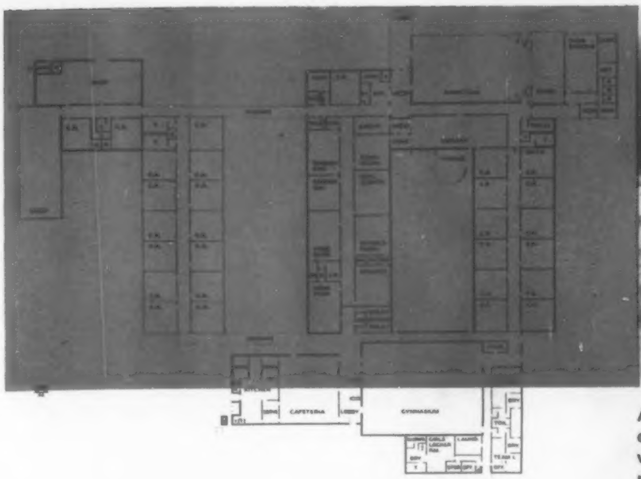
Alvin H. Hanson

The architect, Fritz von Grossman, Milwaukee, divided the overall plan for Nicolet High School, Milwaukee County, Wisconsin, into six major building units. The building, a joined campus type, covers ten acres of the 45 acre site





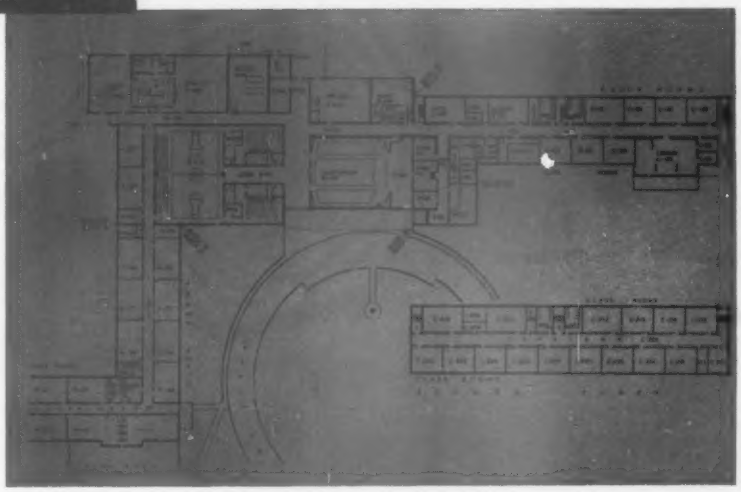
Planned as a quadrangle, the new portion of South Plainfield, N. J., Junior-Senior High School, is a one story building. Corridors are double-loaded. Outside walls are of concrete block with brick facing. Ernest Thornell Brown, architect.



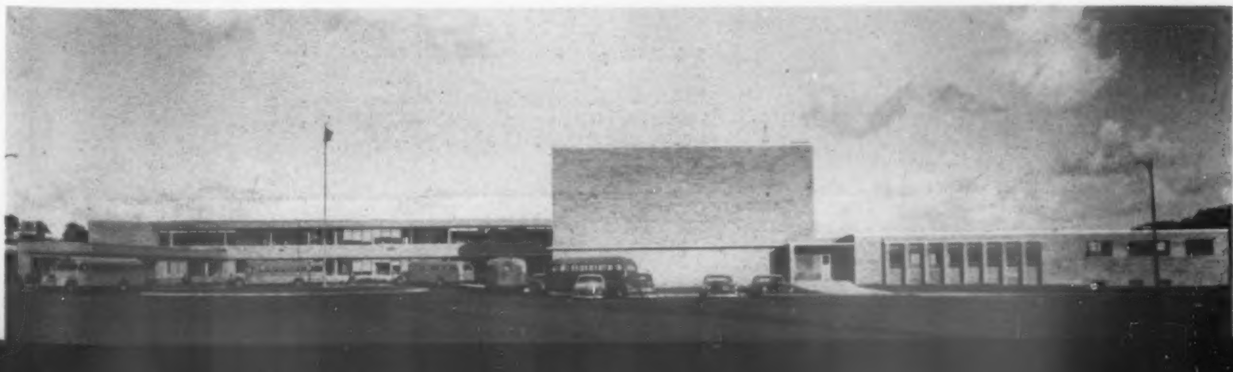
An economical relation between the length of exterior wall and enclosed area at Northern High School, Durham, N.C., was achieved through the use of deep classrooms with plastic skylights to supplement window lighting. George Watts Carr, Durham, North Carolina, is the architect.

COMBINATION SCHOOLS

Ewing Junior High School, Trenton, N. J., was planned with an elementary wing of 12 classrooms and two kindergartens, a junior high school wing of 24 classrooms and a library. The two wings lead to, but are separated by, an auditorium, a gymnasium and a double cafeteria which avoids duplication of these three facilities. Micklewright and Mountford, Trenton, architects. (Plan is at right.)



Westfield Academy and Central School, New York, was designed by Duane Lyman and Associates, architects of Buffalo, for a maximum pupil population of 1,400, kindergarten through twelfth grade. The plan permits buses to discharge and pick up all pupils at the front of the building.



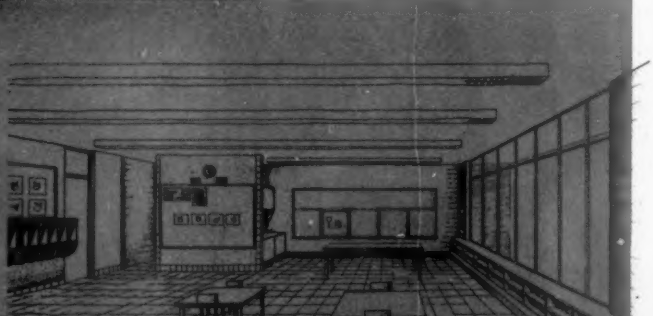
R. DiMaggio

A folding partition can be closed to conceal the wardrobe section at the rear of this classroom in Ewing Elementary-Junior High School, Ewing Township, New Jersey. Micklewright and Mountford are the architects.

CLASSROOMS

First grade room of the Jefferson Elementary School, Gallup, New Mexico, has its own toilet and lavatory, plus a built-in sink and fountain. Wolgamood & Millington are the architects.

Auble Studio



All classrooms in the Fayette Township Consolidated School, New Goshen, Indiana, are self-contained units. Miller, Vrydagh & Miller, architects.

A piano is provided in this primary room of the Plaza Park Elementary School, Evansville, Indiana. The architect is Ralph Legeman.

A built-in projection screen can be adapted for daylight use in classrooms of the West Park Place Elementary School, Newark, Delaware. Architects are the Office of E. William Martin and Donald S. Wason, Associate.

This primary classroom of the Buttonball Lane School, Glastonbury, Conn., has generous space dimensions. Keith Sellers Heine, architect.

The Shaws

Chalkboards in classrooms of the Orrville, Ohio, High School are mounted on the painted cinder block interior walls. Firestone and Motter, architects.

Built-in perimeter work surfaces and cabinets are ideal for special projects in the Mapleshade Elementary School, East Longmeadow, Mass. The school was designed by Alderman & MacNeish.

A typical classroom in the Florentine Hendrick Elementary School, Wolcott, N. Y., has tile wainscot, twin toilet rooms, a lavatory with a bubbler, a teacher's closet and cabinets with a built-in service sink. The exposed steel deck is the finished ceiling. Thomas Lyon White—F. Kirk Helm, associated architects.

A project alcove is part of the classroom in the Community Consolidated School, Coal City, Illinois, designed by William [illegible] Connor and Associates, architects.

Eggcrate fluorescent fixtures light all corners of the spacious classroom in the Westfield Academy and Central School, New York. The designers are Duane Lyman and Associates of Buffalo.

CLASSROOMS

Wide topped desks are part of the classroom furniture in the new elementary school for Goldthwaite, Texas, designed by N. E. Wiedemann, architect.

Laurence E. Tilley

The exposed wood plank ceiling and painted block walls of the classrooms in the Jamestown, R. I., Elementary School are painted pleasing colors. MacConnell and Walker, architects.

Mechanical air conditioning is provided in the South Jal Elementary School, Jal, New Mexico; George R. Graves, architect. Air conditioning was added at a cost of less than 40¢ per square foot.

Pegboard lines one wall of classroom in the Nicolet High School, Milwaukee County, Wisconsin. The architect is Fritz von Grossman of Milwaukee.

MUSIC

Joseph W. Molitor

U-shaped platform risers line three sides of the music room in the Carlisle, Pennsylvania, High School. Architects are Hunter, Caldwell & Campbell.

The music room of the Northwest Elementary School, Newington, Connecticut, has special acoustical wall and ceiling treatment. The lighting is an indirect down type. Moore & Salsbury are the architects.

Fifty pupils can be accommodated in the vocal music room of the South Plainfield, New Jersey, High School, designed by Ernest Thornell Brown, architect.

Harold G. Morse

Concrete blocks form an acoustical pattern behind music students in the vocal room of the Fannett-Metal High School, Willow Hill, Pennsylvania. Edmund George Good, Jr., architect.

Andrews

The library reading room of Carlisle Senior High School, Carlisle, Pa., is a well-lighted, comfortable space. An acoustic ceiling controls sound. The librarian is accessible to any student needing her help. Hunter, Caldwell & Campbell of Altoona, Pa., architects.

Joseph W. Molitor

LIBRARIES

Low bookshelves were designed especially for use by the young people of Lincoln Elementary School, Hartford, Wisconsin. Raymond Le Vee of Appleton, Wisconsin, architect.

Teachers as well as students utilize Orrville, Ohio's high school library. Conference, reading and reference areas are provided. The school was designed by Firestone and Motter, architects of Canton, Ohio.

Hal Rumel

Display cases in the library at Uintah High School, Vernal, Utah, extend to door height and can be seen from the corridor. Lorenzo S. Young of Salt Lake City, architect.

R. DiMaggio

Comfortable furniture, acoustic ceilings, good lighting, modern shelving and librarians' equipment mark Ewing Junior High School's library as a friendly work area. This combination elementary-junior high school was designed by Micklewright and Mountford, architects of Trenton, N.J. and Morrisville, Pa.

Workroom and student conference room at the far end of Northern High School's library, Durham, N.C., are enclosed with glass partitions. Architect is George Watts Carr of Durham.

As designed by Edmund George Good, Jr., architect of Harrisburg, Pa., the library of Fannett-Metal Junior-Senior High School is a ready reference room for all students.

Jamestown, R.I., Elementary School library has convenient work and storage space. Architects are MacConnell and Walker of Apponaug, Rhode Island.

Laurence E. Tilley

R. DiMaggio

AUDITORIUMS

Elementary and junior high school students share a common auditorium in the Ewing Elementary-Junior High School, Ewing Township, Trenton, New Jersey. Micklewright and Mountford, architects.

Jack Stock

Seating in the auditorium of the East Windsor, Connecticut, High School accommodates 652 persons. The architects are Olson, Miller and Associates.

The auditorium of the Westfield Academy and Central School in Westfield, New York, has been constructed as a warm, friendly place where students may enjoy activity programs. Duane Lyman & Associates are the architects.

Joseph W. Molitor

Indirect, cove lighting is used in the auditorium of the Carlisle, Pennsylvania, High School designed by Hunter, Caldwell & Campbell, architects.

The science laboratory of the East Windsor, Connecticut, High School has worktables and seating for lectures. The architects are Olson, Miller and Associates.

Jack Stock

Continuous worktables provide an extensive surface for students in the science room of the Lindsborg, Kansas, Rural High School designed by Thomas-Harris-Calvin & Associates, architects of Wichita.

Andrews

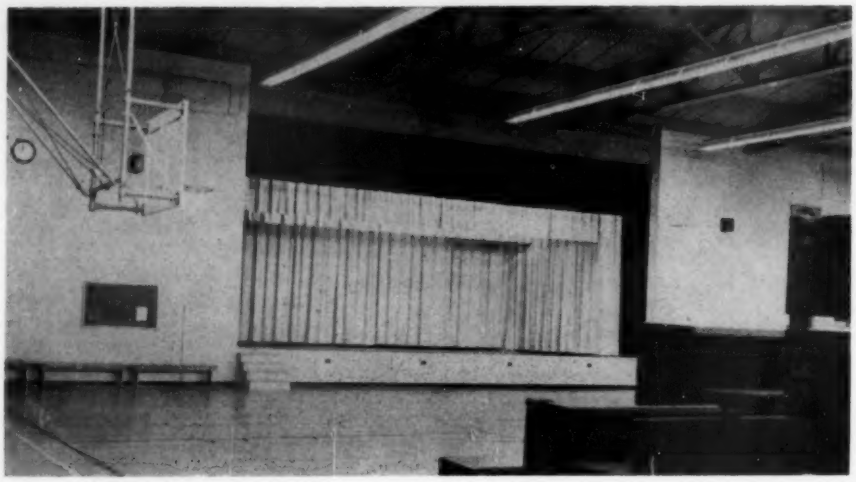
Experiments and book research can be carried out simultaneously in the chemistry classroom of the Fannett-Metal High School, Willow Hill, Pennsylvania. Edmund George Good, Jr., architect.

SCIENCE

It was the aim of the planners of the Orrville, Ohio, High School to surround the students with attractive and functional furniture. Firestone and Motter are the architects.

Tables in the chemistry room of the Uintah High School, Vernal, Utah, have storage cubicles for books and cabinets for equipment. Lorenzo S. Young, architect.

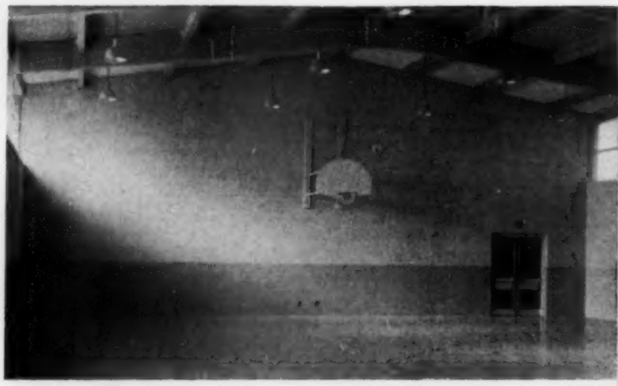
Hal Rumel



Plaza Park, Ind., Elementary School's gymnasium has auditorium facilities combined. Ample seating space and lighting fixtures aid both functions. Ralph Legeman of Evansville, Ind., is the architect.

PHYSICAL EDUCATION

The playroom of Mapleshade Elementary School, East Longmeadow, Mass., is 50 by 80 feet. Alderman and MacNeish, Architects and Engineers, West Springfield, Mass., designed the school.



Berger-Kelley & Associates, architects of Champaign, Ill., designed the Carlyle, Illinois, Community High School gymnasium to seat 2,000 spectators.

Joseph W. Molitor

The gymnasium section at the Carlisle, Pa., Senior High School is located so that day or nighttime student or adult activities may be conducted without interfering with activities in other parts of the school plant. Architects Hunter, Caldwell & Campbell of Altoona, Pa., have had bleachers, to accommodate 1,800 spectators, installed in the gymnasium.

Westfield, N.Y., Academy and Central School's gymnasium, between the elementary and secondary wings of the building, has a long span steel roof. Duane Lyman & Assoc. of Buffalo, architects.

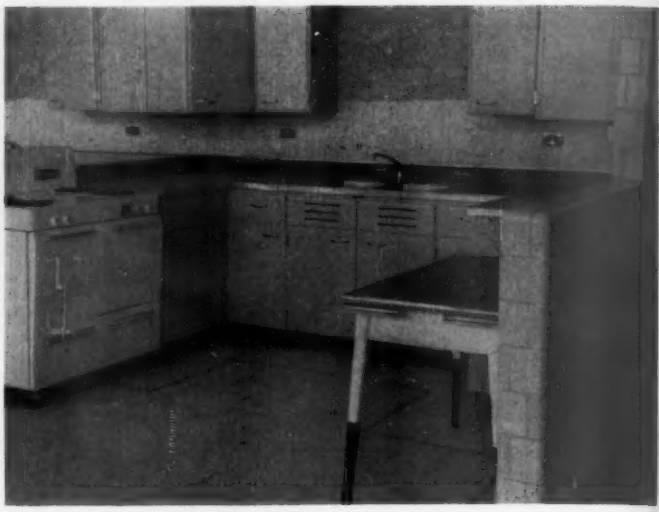
Constructed of steel rigid frames with rolled steel purlins, Durham, N.C.'s Northern High School gymnasium is separated from classroom wings by fire walls and doors. George Watts Carr, Durham, architect.

Thomas Lyon White and F. Kirk Helm, Associated Architects of Geneva, N.Y., designed the playroom of Florentine Hendrick Elementary School, Wolcott, N.Y., large enough to accommodate additional enrollment. Oriented to the south with a large expanse of double glazed windows, an overhang to cut off direct sunlight, maple floor and steel frame, the playroom is an inviting place for its young occupants.

To avoid duplication of facilities, the gymnasium of Ewing Junior High School, a combination elementary-junior high school, Trenton, N.J., serves students from both wings of the building. Architects Micklewright and Mountford, Trenton, N.J. and Morrisville, Pa., planned the gym for community as well as student use.

R. DiMaggio

Harold G. Morse



Students learn the art of homemaking on modern equipment in the South Plainfield, New Jersey, High School. Ernest Thornell Brown of Plainfield is the architect.

There are three rooms in the homemaking suite of the Carlyle, Illinois, Community High School, designed by architects Berger-Kelley and Associates of Champaign.

HOMEMAKING

Built-in counter height and full length cabinets provide ample storage in the clothing room of the Lindsborg, Kansas, Rural High School. The architects are Thomas-Harris-Calvin & Associates of Wichita, Kansas.

Wood cabinets and work counters add a warm touch to the homemaking area of the Fannett-Metal Junior-Senior High School in Willow Hill, Pa. Edmund George Good, Jr., Harrisburg, is the architect.

Different type cooking ranges teach students the merits of each in the cooking area of the Mulberry, Florida, High School designed by W. B. & Thomas V. Talley of Lakeland.

Andrews

Laminated wood beams support the roof and add a decorative touch to the home economics department of the East Windsor, Connecticut, High School. Olson, Miller and Associates of Hartford are the architects.

Jack [illegible]

Hal Rumel

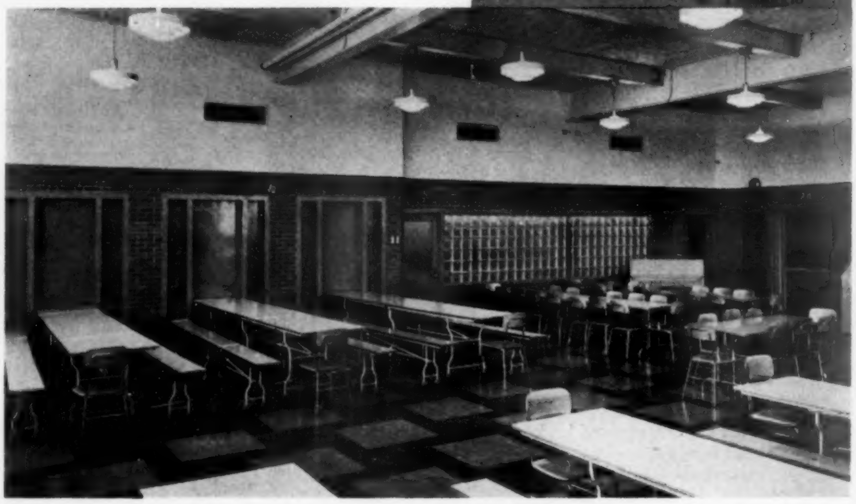
Plastic skydomes provide daylight for the inner areas of the foods room in the Uintah High School, Vernal, Utah. Architect Lorenzo S. Young of Salt Lake City designed the building.

The homemaking area of the Northern High School, Durham County, North Carolina, is a versatile room with work-cutting tables, sewing machines, cooking and serving units. Shelving is also provided for a departmental library. The architect is Geo. Watts Carr of Durham.

Slim-line lighting units provide 30 to 40 foot-candles of illumination in the homemaking room of the Plaza Park Elementary School, Evansville, Indiana. The school was designed by Ralph Legeman, architect of Evansville.

The cafetorium of the Mulberry, Florida, High School has combination bench and table equipment, capable of seating 400. Architects of the school are W. B. & Thomas V. Talley of Lakeland, Florida.

LUNCHROOMS



Movable tables and chairs supplement the in-wall lunchroom equipment in the Ewing Junior High School, Ewing Township, New Jersey. The architects are Micklewright and Mountford.

Hal Rumel

A well equipped kitchen insures service to large crowds without difficulty in the Uintah High School, Vernal, Utah. Lorenzo S. Young, architect.

The cafeteria of the Northwest Elementary School in Newington, Connecticut, doubles as an auditorium. The architects are Moore & Salsbury.

Laurence E. Tilley

Kitchen equipment in the Jamestown, Rhode Island, Elementary School was supplied at a cost of $11,213. MacConnell and Walker, architects.

Dadoes are glazed tile in the kitchen of the Mapleshade Elementary School, East Longmeadow, Massachusetts. Alderman & MacNeish, architects.

The kitchen floor in Florentine Hendrick Elementary School, Wolcott, New York, is six inches lower than the cafeteria floor to accommodate workers at the serving line. Thomas Lyon White and F. Kirk Helm, associated architects.

Future expansion of the Northern High School, Durham County, North Carolina, will not inconvenience the kitchen and cafeteria, which were designed to accommodate the full student load. Geo. Watts Carr is the architect.

Harold G. Morse

The woodworking shop of the South Plainfield, N.J., Junior-Senior High School, is one of three shops isolated in the industrial arts wing of the building. Ernest T. Brown, architect.

Equipment costs for the Mulberry High School, Polk County, Florida, were kept to a minimum by utilizing staff skills. Mahogany desks for the industrial arts classroom were designed by the shop teacher. Architects are W. B. and Thomas V. Talley of Lakeland, Florida.

SCHOOL SHOPS

Industrial arts classrooms of the Fannett-Metal Junior-Senior High School, Willow Hill, Pa., are separated from the academic wing for noise control. To prepare the students for post-high school vocations, equipment of industrial caliber has been provided. Designed by Edmund George Good, Jr., architect of Harrisburg, construction cost $13.25 per square foot.

Lindsborg Rural High School, Lindsborg, Kansas, was designed by Thomas-Harris-Calvin & Assoc., architects of Wichita. Industrial arts students have been provided with the latest equipment.

Architects for the Carlyle Community High School, Carlyle, Illinois, were Berger-Kelley & Assoc. of Champaign. This shop facility is one of four included in the high school, for student and adult use.

Modified versions of standard office desks hold the typewriters in the business education classrooms at Carlisle High School, Pa. Modern files, secretary chairs, acoustic ceilings and good lighting lend business atmosphere. Hunter, Caldwell and Campbell, architects.

Joseph W. Molitor

BUSINESS EDUCATION

Students in the business education department at Lindsborg Rural High School, Kansas, learn the most up-to-date office procedure to better fit them for post-graduation jobs. Brick and glass walls divide areas of work. Thomas-Harris-Calvin and Associates, architects.

Andrews

Glass window blocks admit daylight to supplement light from incandescent fixtures. Desks are of blond-finish wood and have book pockets to facilitate work. Fannett-Metal High School, Willow Hill, Pa. Edmund George Good, Jr., architect.

In the kindergarten at Northwest Elementary School, Newington, Conn., the teacher's desk is accessible to all the children. Architects Moore and Salsbury designed this room with its brick wall, large windows, good lighting, sink and work cabinets to help young students onto the right learning path. Trapezoidal tables, molded plywood chairs, low display screens and the outdoor play yard complete the atmosphere.

KINDERGARTENS

Low partition in the kindergarten at Florentine Hendrick Elementary School, Wolcott, N. Y., shields coat cubicles. Doors back of partition provide entrance to toilets. Thomas Lyon White—F. Kirk Helm, Geneva, New York, architects.

R. DiMaggio

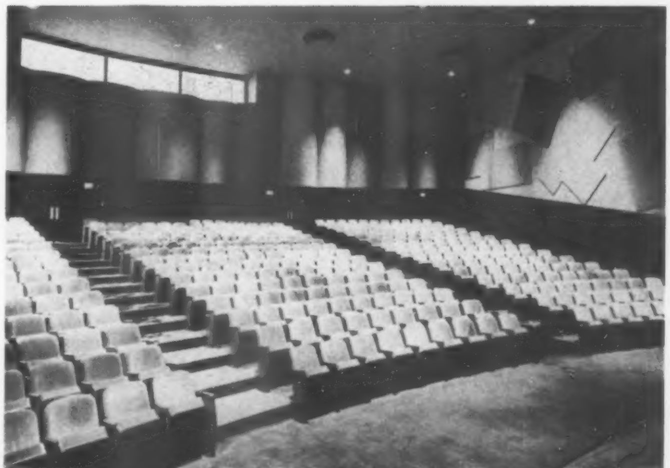
Toys are stored in under-window cabinets behind sliding doors in the kindergarten in the elementary school wing of Ewing Junior High School, Trenton, N. J. Architects Micklewright and Mountford provided a recessed folding-door coat closet, toilets and a drinking fountain for these youngest pupils.

The kindergarten at Westfield Academy and Central School, N. Y., has an indoor slide. Furniture is child-scaled and movable to permit varied groupings for different activities. Duane Lyman and Associates, architects.

COLLEGE BUILDINGS

Bee Photos

The new Music-Speech Building at Sacramento State College cost $920,000, including equipment. The school was designed by the State Division of Architecture.



The building contains four music classrooms, like the one at top right, a band and chorus rehearsal room, practice rooms, a radio studio (below right) and control room, speech clinic, faculty offices and a little theatre (above left) that seats 450 persons. The theatre has a large stage, dressing rooms and a stagecraft room. The acoustical treatment was planned by Mr. Darrel Fitzroy, acoustical engineer. The acoustical designs, which have been integrated with the decorative scheme, are painted a combination of blue, yellow or coral against a background of gray. The building is completely air-conditioned and is constructed of reinforced concrete.

COLLEGE BUILDINGS

The William H. and May D. Taylor Memorial Library and the John M. Reeves Student Union Building were designed for Centenary Junior College, Hackettstown, New Jersey, by Jan Hird Pokorny, architect of New York.

The student union building has a fir roof plank and laminated wood arches, redwood soffits, canopies and ceilings in the lounge. The auditorium floor is of maple. The building contract was $254,373. The wood construction gives the building much of its warmth and character, being informal enough for the use of picnic parties and gymnastic events, but in the discipline of its wood detailing it is elegant enough to make an appropriate setting for formal dances.

There is a spacious lounge for group meetings or informal relaxation, with smaller lounges provided on the lower level. The building also has a kitchen.

Rollie McKenna Photos

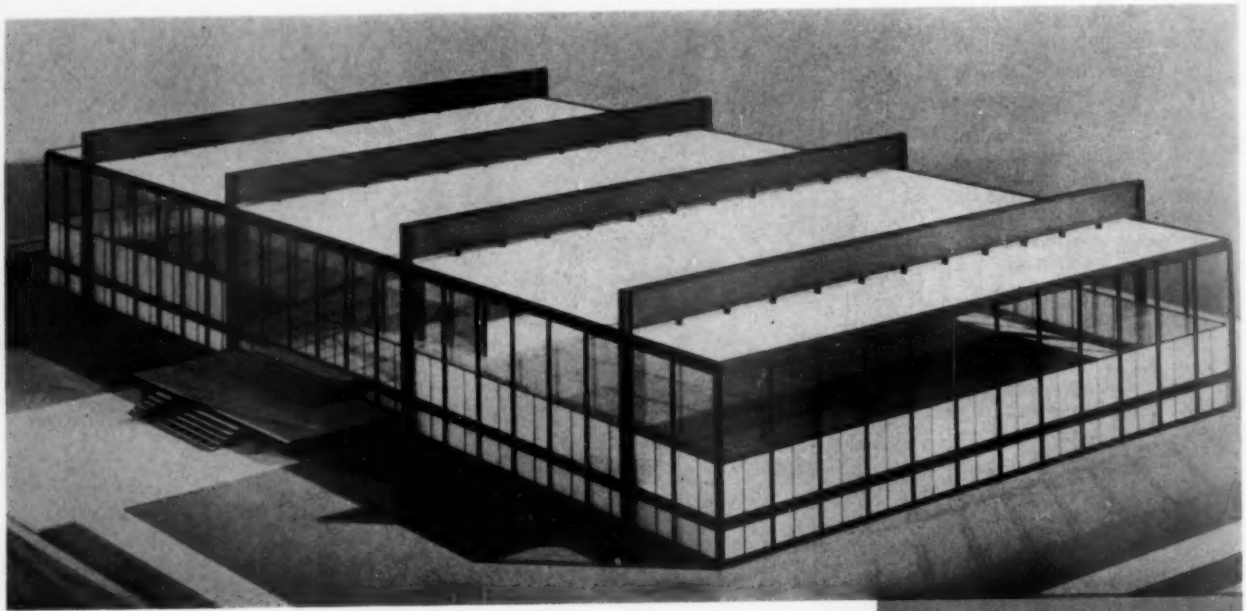
The William H. and May D. Taylor Memorial Library was constructed at the same time as the student union. The lobby floor is of stone flagging, with rubber tile and asphalt tile used in other areas. The building contract amounted to $308,-197. The building includes a periodical room, classroom, a music listening room, a seminar and conference room, a smoking lounge, outdoor reading terrace and a museum and faculty reading lounge.

Ben Schnall

Ben Schnall

The library building has reinforced concrete foundation walls, structural steel framing and masonry bearing walls. Open web joists and thin reinforced concrete slabs, steel sash and insulated spandrel panels are other construction details. Where acoustical treatment is needed, architect Jan Hird Pokorny has specified fiberglas backing for the perforated wall panels. The smoking lounge, at left, has stone flagging flooring, similar to the lobby floor. The architect has used color as the chief means to achieve warmth and an atmosphere [illegible] welcome in this contemporary building. [illegible] Pokorny designed and selected all interior furnishings and equipment, including cabinet work and special shelving.

Rollie McKenna



COLLEGE BUILDINGS

The new Architecture, Planning and Design Building at Illinois Institute of Technology, Chicago, is a $750,000 glass and steel structure of advanced design. The architect of the building is Ludwig Mies van der Rohe, director of the Department of Architecture at the Institute and campus architect.

The building is completely enclosed with plate glass; the lower sections are opaque. The roof plate is suspended from four overhead steel girders and the large main hall is column free. The main floor is elevated five feet above ground to permit natural lighting and ventilating of the basement area. The main hall is mechanically ventilated and contains two large drafting areas on either side of a central core area defined by low, free standing wood walls which form administrative offices, a library and an exhibition hall. The basement contains studios, workshops, storage rooms and lecture rooms.

The Frederic William Boatwright Memorial Library at the University of Richmond is a million dollar structure designed by architects Carneal and Johnston, Richmond.

The building has two wings. The east-west wing is three stories high and houses the book stacks and the reading room, shown at top. The north-south wing has two stories with reading space and stacks. The foyer leads to the circulation desk, above left; and the rare books room, above right, is a repository for many old and rare volumes.

Dementi Studio Photos

The library is of Tudor Gothic architecture. The brick and limestone structure is featured by a carillon tower 140 feet in height.

CONTRIBUTING SCHOOLS

The pictorial review of New School Buildings of 1955 was made possible through the assistance and cooperation of the superintendents, college presidents and architects of the thirty-three schools presented. A complete listing follows:

Music-Speech Building, Sacramento State College, Sacramento, California; executive dean, F. Blair Mayne; architect, State of California Division of Architecture, State Department of Public Works.

East Windsor High School, East Windsor, Connecticut; superintendent, Merle B. Woodmansee; architect, Olson, Miller and Associates, Hartford.

Buttonball Lane Elementary School, Glastonbury, Connecticut; superintendent, R. Daniel Chubbuck; architect, Keith Sellers Heine, Hartford.

Northwest Elementary School, Newington, Connecticut; superintendent, John W. Wallace; architect, Moore & Salsbury, West Hartford.

West Park Place Elementary School, Newark, Delaware; superintendent, Wilmer E. Shue; architect, Office of E. William Martin, Donald S. Wason, Associate, Wilmington.

Mulberry High School, Mulberry, Polk County, Florida; supervising principal, W. H. Purcell; architect, W. B. & Thomas V. Talley, Lakeland, Florida.

Carlyle Community Unit High School, Carlyle, Illinois; superintendent, C. K. Winn; architect, Berger-Kelley & Associates, Champaign, Illinois.

Architecture, Planning and Design Building, Illinois Institute of Technology, Chicago, Illinois; president, John T. Rettaliata; architect, Ludwig Mies van der Rohe, director, Department of Architecture.

Coal City Community Consolidated Elementary School, Coal City, Illinois; county superintendent, Lillias K. Walker; architect, William J. Connor and Associates, Harvey, Illinois.

Pittsfield, Illinois, High School; superintendent, J. H. Voshall; architect, D. Clarence Wilson, Mount Vernon, Illinois.

Plaza Park Elementary School, Evansville, Indiana; superintendent, E. J. Eberhart; architect, Ralph Legeman, Evansville, Indiana.

Fayette Township Consolidated School, New Goshen, Indiana; county superintendent, W. E. Purcell; architect, Miller-Vrydagh-Miller, Terre Haute.

Lindsborg, Kansas, Rural High School; superintendent, LaVern W. Soderstrom; architect, Thomas-Harris-Calvin & Associates, Wichita.

Mapleshade Elementary School, East Longmeadow, Massachusetts; superintendent, Robert J. Jarvis; architect, Alderman & MacNeish, West Springfield.

Taylor Memorial Library and John M. Reeves Student Union Building, Centenary Junior College, Hackettstown, New Jersey; president, Edward W. Seay; architect, Jan Hird Pokorny, New York City.

South Plainfield, New Jersey, High School; superintendent, E. Perley Eaton; architect, Ernest Thornell Brown, Plainfield, New Jersey.

Ewing Elementary-Junior High School, Ewing Township, Trenton, New Jersey; superintendent, Gilmore J. Fisher; architect, Micklewright and Mountford, Trenton.

Jefferson Elementary School, Gallup, New Mexico; superintendent, Charles S. Owens; architect, Wolgamood & Millington, Santa Fe.

South Jal Elementary School, Jal, New Mexico; superintendent, J. L. Burke, Jr.; architect, George R. Graves, Hobbs, New Mexico.

Westfield, New York, Academy and Central School; supervising principal, Edwin L. Fisher; architect, Duane Lyman and Associates, Buffalo.

Paumanok Grade School, West Islip, L.I., New York; district superintendent, Walter M. Ormsby; architect, Frederic P. Wiedersum Associates, Valley Stream, New York.

Florentine Hendrick Elementary School, Wolcott, New York; supervising principal, R. W. Crouse; architect, Thomas Lyon White & F. Kirk Helm, Geneva, New York.

Northern High School, Durham County, North Carolina; county superintendent, Chas. H. Chewning; architect, Geo. Watts Carr, Durham, North Carolina.

Orrville, Ohio, High School; superintendent, R. E. C. McDougall; architect, Firestone and Motter, Canton, Ohio.

Carlisle, Pennsylvania, Senior High School; superintendent, David L. Swartz; architect, Hunter, Caldwell & Campbell, Altoona, Pennsylvania.

Fannett-Metal High School, Willow Hill, Pennsylvania; county superintendent, Thomas W. Smith; architect, Edmund George Good, Jr., Harrisburg.

Jamestown, Rhode Island, Elementary School; superintendent, Anthony J. Miller; architect, MacConnell and Walker, Apponaug, Rhode Island.

Goldthwaite, Texas, Elementary School; superintendent, J. T. Jones; architect, N. E. Wiedemann, Waco, Texas.

Uintah High School, Vernal, Utah; superintendent, Max G. Abbott; architect, Lorenzo S. Young, Salt Lake City, Utah.

Frederic William Boatwright Memorial Library, University of Richmond, Richmond, Virginia; president, George M. Modlin; architect, Carneal & Johnston, Richmond.

Lincoln Elementary School, Hartford, Wisconsin; principal, Clement E. Nodolf; architect, Raymond LeVee, Appleton, Wisconsin.

Nicolet High School, Milwaukee County, Wisconsin; superintendent, Michael S. Kies; architect, Fritz von Grossman, Milwaukee.

Sussman-Ochs

School plant planning procedures in big cities involve many special problems. A new high school for Baltimore, Maryland, is the Edison-Barton-Mergenthaler Vocational Technical High School designed by architects Taylor and Fisher. Cost of the contract is $6,188,000.

CHALLENGE OF THE BIG CITY

by JOHN H. FISCHER

Superintendent of Public Instruction, Baltimore, Maryland

A native of Baltimore, Dr. Fischer received a B.S. degree from Johns Hopkins University. He also has M.A. and D.Ed. degrees from Columbia University and an honorary LL.D. from Morgan State College. Dr. Fischer joined the staff of the Baltimore Public Schools in 1930 as an elementary teacher. He succeeded to other teaching and administrative positions until his appointment in 1953 as Superintendent of Public Instruction.

PLANNING school facilities for great urban centers involves problems that are in a class quite to themselves. These special problems arise only in part from situations caused by the concentration and congestion of the big city. In large measure they are caused by sociological, cultural and economic factors indirectly related to density of population.

Moreover, these problems are complicated by our own lack of experience in providing universal education of high quality for the diversified population typical of most large American cities. Indeed, we have a great deal to learn about most aspects of urban planning and development; and there is reason to believe that the improvement of school plants and programs will scarcely progress much faster than the whole of urban life, to which public education is so closely related.

Unless the school participates as a partner and leader in general community betterment, it will fall far short of both its purpose and its potential. Effective membership in the community has not always characterized schools, but the trend in recent years has been unmistakably in the direction of a closer working relationship with all city agencies and elements. The day of the self-contained school system is behind us.

In looking to the next half century, as schoolhouse planners are of necessity required to do, we must assume a much more general acceptance of the community school concept. School plants must therefore be conceived and designed with this trend as a basic consideration. The larger cities will be able to learn here from smaller districts, notably some of the more forward-looking central or consolidated schools in rural areas, as well as schools in small and medium-sized communities.

School Design Is a Key Factor

Some of the most difficult educational problems of our time are to be found in the large city and their solution will inevitably affect and be affected by the


Sussman-Ochs

Another new school planned for Baltimore is the Fallstaff Road Elementary School. The architects are Wrenn, Lewis and Jencks and the contract cost is $504,750.

design of school plants. These urban problems would be easier to deal with if they were merely matters of organization and administration. To be sure there are still many imperfections in these fields, but our major difficulties have to do with philosophy, curriculum and community relations.

The roots of these problems are deep in the complex and varied culture of the metropolis. In many places, before the school plant problem can be solved, the community's expectation of the school will have to be clarified. Once the mission of the school is determined, the community will have to provide the support necessary to accomplish the assigned task.

Many men and women, familiar with the work of urban schools, see in this segment of public education one of its most challenging frontiers. Two facts, especially, support their view. The first is the rapid exodus from many cities of families in search of a good place to raise their children. This emigration poses a serious threat to our urban society and presents school people and all others interested in education with a very tough problem that must be attacked without delay.

The second is the equally rapid movement into some cities of individuals and families from rural areas, who bring with them cultural patterns ill-adapted to city life and only the most meager of vocational skills. These families, too, are a challenge to the public school, as they are to the whole community.

Decisive Action Is Needed

Unless we are willing to write off the big city as an interesting experiment that does not quite measure up to the American dream, more of our cities will have to take the kind of bold and decisive action which some leading municipalities have already begun. We must reestablish in the big city those qualities which will restore its attractiveness to people of intelligence, good taste and ambition. No city can maintain its well-being if it loses large segments of its ablest families and becomes a haven for those who know little more than a subsistence scale of living.

The essence of the matter is to preserve the big city as a place of opportunity for all, while we take care to retain in it also those characteristics which make it a desirable place of residence for the discriminating. Few of the means available to us for this purpose offer the promises found in good schools. Wisely set up and well integrated into a sound community plan, good schools can become centers and generators of civic improvement.

The most important fact about a school is that it serves all people—children and adults. It accordingly follows that the foundation of any school building program must be a thorough and continuing study of the population to be served. Of obvious importance anywhere, this becomes a matter of special concern in the big city where migration in and out and shifts of population within the school district are often of greater significance, and more difficult to forecast, than fluctuations in the number of births or birth rates.

Collecting Population Data

In the majority of cities it will be neither necessary nor desirable for the school administration to start from scratch in the collection of population data. The chief concern is, rather, the formulation of a program to coordinate the information already available at reliable sources. Federal census reports and local vital statistics, supplemented by school enrollment figures, provide the basic material for any population study program, but these must be continually reexamined and supplemented to clarify short term trends and sectional variations within the city. Rates of migration and their timing are usually difficult to forecast but they are essential details, especially where the shifts involve the in-migration of social or racial groups characterized by family units of a different size from those being replaced.

If school plants are to be planned in accord with

the program requirements, and if programs are to meet the needs of the people to be served, much more should be studied than the number of children in a given city block or district. An adequate population study program must accordingly include qualitative considerations as well as the standard quantitative approaches. To achieve such a qualitative dimension, principals, teachers, parents, other citizens and representatives of community organizations will need to be involved as sources and interpreters of data.

Cooperation With Others

In this phase of school plant planning, as in others, close cooperation with other governmental and lay groups is of great value. Such cooperation, to be fully fruitful, must be set up to provide continuing working relations with many agencies. In the typical city these will include planning and zoning authorities, health agencies, census officers, public utilities, builders and real estate operators and those who issue construction permits. Not only must there be a sound working arrangement with each of these but all who are involved must understand something of the problem of school plant planning and accept responsibility for assisting in its solution.

To assure the best possible integration of education with other community functions and to promote efficiency and safety in the location and use of school facilities, the planning of school building programs should be closely coordinated with other aspects of community development. Few American cities were originally laid out according to a comprehensive master plan, but increasing attention is now being given to the creation of such plans. City planning agencies are winning recognition and are being granted more authority but, because of the usual legal separation of school boards from municipal governments, special attention is required in most cities to provide adequate liaison between school planning and the total program of community improvement.

The location of existing or projected traffic arteries has long been recognized as a major factor in the selection of school sites. In view of the rapid multiplication of expressways through and around large cities, this factor now takes on increased importance, especially since limited access highways often create new barriers which divide previously unified communities. School administrators and boards are required to view such arteries not merely as means of access to schools or as hazards to the safety of children. Many of the modern freeways, because of their design, will actually be neither. But they often serve, as effectively as natural barriers, to form the boundaries of an attendance unit or the periphery of a neighborhood.

The location and design of highways will influence not only the development of new housing but also the existing patterns of land use. The relative desirability of residential property will often be sharply affected. Some of these effects are more difficult to predict than others, but each must be considered to the extent possible, for every one will have its bearing upon the need for schools and the uses to which they will be put.

The School and Highway Planning

Because most cities will probably be influenced in the future more strongly by the traffic patterns they establish than by any other single man-made factor, school people will need to work closely with those responsible for highway planning. Only by the closest coordination of school and highway planning will it be possible to serve the best interests of the community or to avoid serious and costly errors.

More and more we are viewing our large cities as collections of neighborhoods. This is what they always have been, but the officials responsible for public services have not always acted as though they were aware of the fact. The establishment of traffic arteries sometimes consolidates existing neighborhoods and occasionally creates new ones in the form of residential islands surrounded by through streets and freeways.

Baltimore's new Cross Country Boulevard Elementary School will be of one and two story construction. Buckler, Fenhagen, Meyer & Ayers, architects; cost, $831,754.

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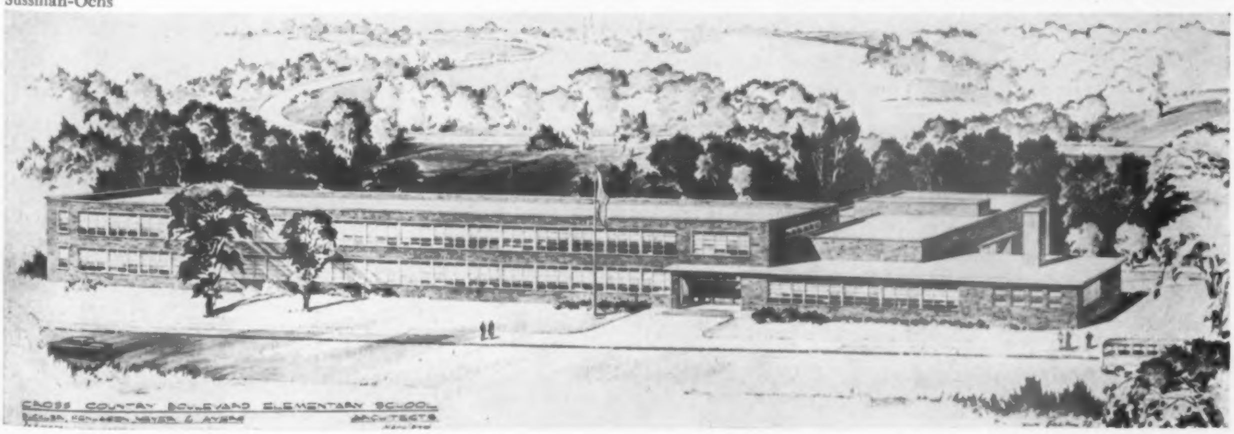
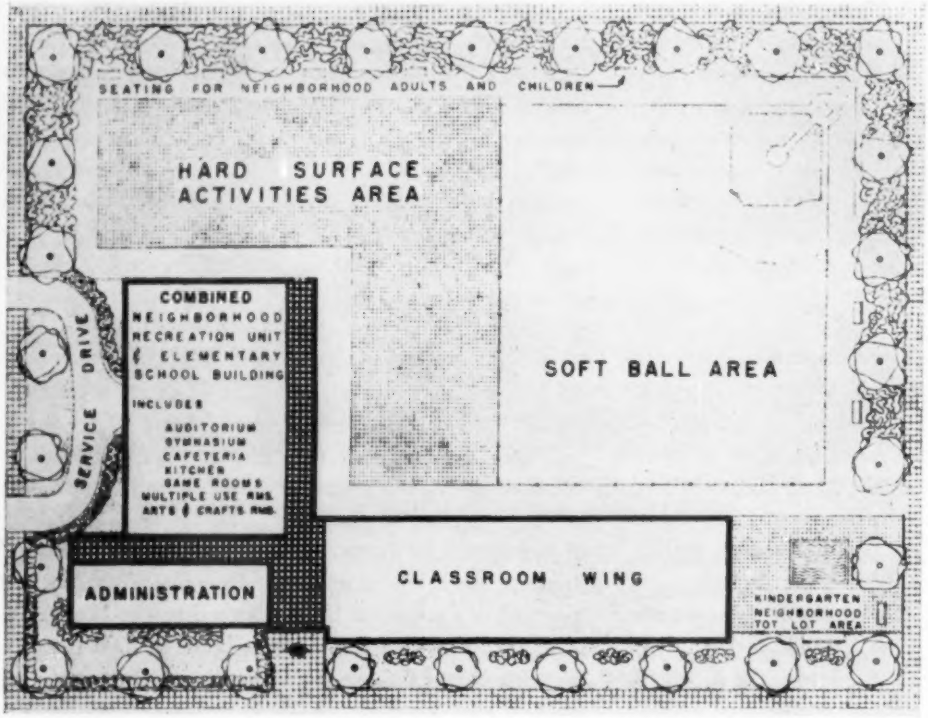
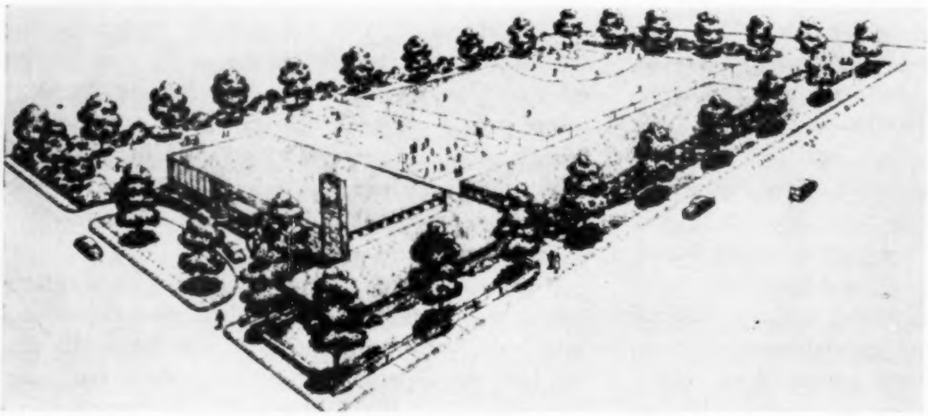






Schools for the big city can be planned as combination neighborhood recreation centers. A plan by the Planning Commission of the City of Baltimore includes a combination neighborhood recreation unit and elementary school building. The site has a hard surface activities area, a softball area and a kindergarten-neighborhood tot lot space. The school itself has an auditorium, gymnasium, cafeteria, kitchen, game rooms, multiple use rooms, arts and crafts areas, administration unit and a classroom wing.

Within these islands schools can, and currently often do, serve as centers for both juvenile and adult activities. When these centers can offer both education and recreation, their value is greatly enhanced.

School-Recreation Centers

Careful master planning of neighborhood centers, which takes into account the usefulness of existing school structures and provides for necessary expansion or replacement, can be one means toward a substantial improvement in urban living. Such school-recreation centers may, moreover, constitute "breathing spaces" in congested areas when they are designed with a regard for aesthetic values and include suitable planting and benches as well as open play areas. Typically, the nucleus for such a center will be the school plant, including such standard elements as classroom, auditorium, gymnasium, library and cafeteria. In some situations, because of financial or space limitations, the school plant will constitute the total physical set up.

In other places, additional recreational facilities such as game rooms, meeting rooms or extra gymnasium space will be provided. The facilities of these centers, indoor as well as outdoor, should serve both school and community needs, with spaces designed to meet the needs of children, young people and adults.

In projecting the development of such centers the need for cooperative planning is self evident. Not only should school and recreation officials work closely together and with the local planning authority but, if the centers are to be of the greatest usefulness, all three of these must also work with citizen groups.

Urban Renewal Schemes

Another aspect of city planning with which schools must be closely associated is the improvement of hous-

ing in older areas of the community where obsolescence is a problem and substandard or slum conditions a distinct possibility. Financial assistance to localities to correct these conditions by means of "urban renewal" is now available under the Federal Housing Act of 1954. A broad-scale approach involving many governmental and private agencies is required to accomplish an urban renewal project. School authorities must be prepared to play a major role in the work, in some instances giving active leadership in initial planning. As such enterprises develop, opportunities will be seen for mutually desirable educational activities involving both children and adults.

Urgent Problems Are Raised

The almost explosive expansion of some cities in recent years has raised urgent problems of schoolhouse construction. Those cities in which advance site acquisition was a regular part of school plant planning are now grateful for the foresight which led to such action. About past failures to acquire sites sufficiently early, nothing can be done and little need be said. For the future, it is important to establish free and continuing communication among school authorities, local planning and zoning authorities and whatever bodies or officials are authorized to approve subdivision plans or issue building permits.

Similarly, real estate developers, individually and through their organizations, must work closely with school people to assure adequate school services for new communities. Growing recognition by leaders of business and industry of the contributions good schools make to the economic health of communities is a new factor of substantial weight. School planners have the obligation to work closely with such interests and to give the leadership and resource service for which their competence equips them.

Although full consideration must be given to many other elements the major obligation of those responsible for planning schools is to provide the basis of sound and forward-looking education. The criticism is frequently heard, and with some justification, that educational practice advances too slowly in the big city systems. It may be pointed out in rebuttal that some of the best public education available anywhere is to be found in America's great cities. But the inescapable fact remains that there is often a cumbersomeness about large organizations that renders them less adaptable than smaller ones. As more big cities come to recognize the advantages of decentralization and the weaknesses of excessive uniformity, interesting pioneering developments are occurring.

Maximum Flexibility for Schools

If program innovations and adaptations are not to be hampered by physical factors, school plants will have to be designed and projected with maximum flexibility. Especially does this present problems to those

The restricted sites available in the big city often mean multiple story construction, as in the Leith Walk Elementary School for Baltimore, Tyler, Ketcham & Myers, architects. Contract cost of the building is $1,048,298.

Sussman-Ochs

responsible for secondary school plants, since it appears likely that elementary schools will change less in the next half century than junior and senior high schools and junior colleges.

The urgent problem now facing the high school is to retain the strength of traditional academic programs while it simultaneously creates equally valid and sound programs for pupils who, until quite recently, were not even considered candidates for secondary education. If we are to educate these young people adequately, it is obvious that the curriculums for them will be quite different from those designed for pupils with higher academic aptitudes. And for all young people the high school must make greater efforts to relate its instruction to current needs and resources.

The Program Question

While any effort to predict the nature of tomorrow's school is somewhat hazardous, we may be reasonably confident that many of the elements to be found in the school of the future are already present in the best of our existing schools. This is not the place for an exhaustive examination of the program question but a few of the practical considerations may be pointed out. It seems quite likely, for example, that much more use will be made of electrical and mechanical instructional aids, including closed circuit television.

The size of teaching groups will probably vary from small units of a half dozen pupils or fewer to large groups of several hundred for certain types of presentations. Practical arts will doubtless receive increased attention, as will activities involving direct experience in the community. The probability is not too remote that instead of the present system of one full-fledged teacher to each class of twenty-five to thirty pupils, we may see a plan under which a master teacher will work with a group of assistants to supervise several classes. All of these practices are now in effect on a limited scale, and the seed of the future may well be in them.

Nowhere in America is there a need for more careful attention to the improvement of education than in our big cities; nowhere is there a greater challenge of people in need of education. And, fortunately, in most of these cities the potential for progress is considerable.

How, then, shall we build schools to house our present programs while we look to a future for which we shall have developed better ways to teach and learn? At the very least, we can agree that partitions should be easily movable to assure variability in the size of spaces and in their interrelationship. Provision for the increased use of electronics is obviously required. Ready physical access between the school and the community is most desirable. Other generalizations can be set forth, but it seems clear that neither schoolmen nor architects have much more than scratched the surface in designing buildings to meet the special needs of urban areas.

Up to this time, much of the pioneering in school building design has occurred in small or rural communities. Many of our leading architects have developed their most interesting structures on the edge of open country or in small, homogeneous suburban towns.

The field is wide open for creative approaches to the problems of schoolhouse planning in big cities. Because sites of 30 to 50 acres in these places are rare, the task of the architect is to design flexible structures on limited sites. And, because many cities face financial difficulties, architectural creativity will be even more helpful when achieved on a low budget.

The Challenge Is Clear

The solutions may be obscure, but the challenge of the big city is clear. With steadily rising millions of our public school pupils attending school in cities of 100,000 or more, it is obvious that a large share of our best thinking must be centered upon the urban areas of our country. The high budget structure, characterized by extensive open spaces and located in a favorable residential suburb, is to be commended and envied. It should also be used as a source of useful data for other systems. But if most American children are to enjoy that equality of opportunity which we tell them is their birthright, the innovations of good school construction must find their way into the metropolis, and be available on both sides of the tracks.

It is a truism that schools must be built where the children are. If we are to educate all of our boys and girls as well as we should, many of our best schools will have to be built in our big cities. The task will tax the intelligence and ingenuity of architects, school people and citizens, but the stakes are high and the rewards of success will be commensurate with the effort required.

When the educator and the architect work closely together on a school building project, each will benefit from the other's past experience and ability.

WORKING WITH THE ARCHITECT

by LESTER W. SMITH

AIA, Sherwood, Mills and Smith, Architects, Stamford, Connecticut

Mr. Smith has an A.B. degree from Princeton University and graduated with the highest honors in architecture in 1930. He also holds an M.F.A. degree from Princeton and attended the Fontainbleau School of Fine Arts. Mr. Smith was a chief designer and site planner for Caribbean Architect-Engineer in Trinidad, B.W.I., prior to service with the U.S. Army Air Forces from 1942–1946.

and EVAN E. JONES

Formerly Superintendent of Schools, Port Chester, New York

Mr. Jones has an A.B. from Hamilton College and an M.A. from Teachers College, Columbia University. He has also completed graduate work at New York University. Mr. Jones served as a school administrator in New York State for 39 years, 21 of them in Port Chester. He has also lectured in Educational Administration at Alfred University and New York University.

CLOSE cooperation between the educator and the architect is essential to the creation of a good school building. The architect brings to the job his skill as a designer, his knowledge of materials and methods of construction and his previous experience in school planning. The educator contributes his understanding of the community and its needs, his practical knowledge of school administration and his educational philosophy.

When a superintendent and his board of education decide to employ a firm of architects for a new school building, many factors have to be considered. How many children is the building expected to house? What services are to be furnished the pupils? Is there going to be a revision of the present curriculum? What are the teaching techniques of the staff? Should a gym, an auditorium, a library *and* a cafeteria be included? Are there any objections to multi-purpose units? What provisions shall be made for lighting, heat and plumbing?

Each community answers these questions and myriad others according to its specific needs and educational outlooks. The superintendent, principals, teachers, custodians and laymen all have ideas of what the new school should contain. The architect, too, has ideas. How can all the plans be incorporated into a workable scheme?

Program Requirements Are First

Determining the program requirements is the logical first step. Sometimes an outside survey team or educational consultant is employed to help formulate the requirements. In other communities the staff is organized into seminars or workshops to air its views and afford a degree of unanimity and wider acceptance of proposed curricular changes. In this way the school superintendent can present the architect with a broad understanding of the activities his building is to house. In most cases, of course, the staff and the superintendent suggest, but the board of education makes the final decisions as to what should be incorporated into the building.

If the architect has been informed of his client's ideas and is present when the report is made to the board, he can estimate the costs of some of the recommendations at that time. While the superintendent ex-

plains the educational value of the ideas, the architect can discuss with the board the problems involved in incorporating them into the structure.

Next, there must be ample opportunity to discuss the number of rooms desired, their approximate size and use, location of classrooms and special purpose rooms, movement of pupil traffic and use of the school by the public during non-school hours. The character of the space needed will vary with each community.

For instance, in a school where most of the children will return home for lunch, a combination gymnasium and cafeteria may be adequate. If a school is to serve as a recreational and social center for a town, an auditorium or other large meeting room is a necessity. The superintendent of a recently designed Connecticut high school estimates that about one-fourth of the students will drive themselves to school. Obviously the parking requirements in this case will be much greater than those of an elementary or an urban school.

Preliminary Plans Are Drawn

After the exact needs have been determined, recommendations considered and the new program crystallized, the architect has a full understanding of the staff's teaching techniques and educational aims, and is ready

It may be necessary to organize the school staff into seminar groups for the purpose of studying and analyzing the needs of the school system.

to prepare preliminary plans. These preliminary drawings are presented to the board of education for acceptance before final specifications are compiled. The superintendent also has a chance to survey the plans to check for any traffic problems that might be inherent in the design, to see that the staff's recommendations have been incorporated and, at this point, to discuss materials which can aid instructors and custodians.

Presenting preferences for tackboards or chalkboards in particular spaces is the educator's province;

Wide community support must be enlisted, with much publicity given to the project.

determining where to use brick, concrete, steel, wood or glass is the architect's field and is, in most cases, discussed with the board of education. The custodial staff's experience with cleaning and maintaining different materials is also considered before final plans are submitted.

Win Citizens' Cooperation

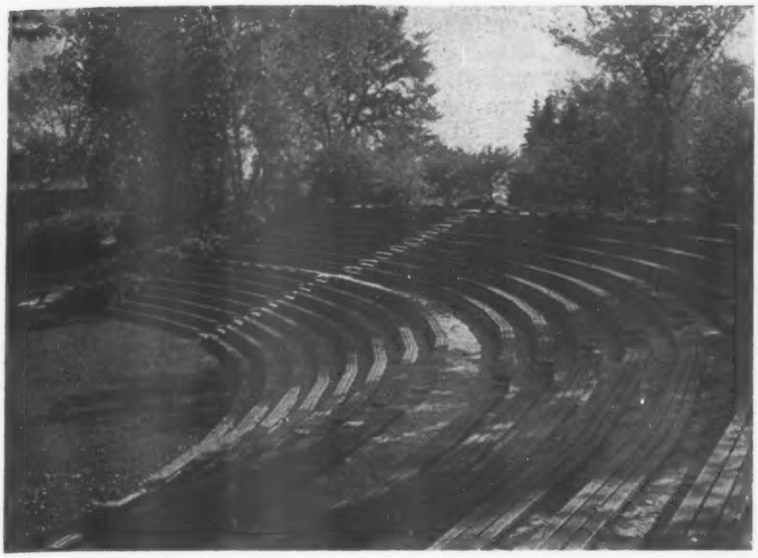
The next task is to win full local participation in the project. Often a public meeting is held in which the superintendent and architect undertake jointly to describe the proposed new school and explain the evolution of the design. By means of a printed brochure or speeches to interested groups or organizations, the architect can help the educator achieve the goal of enthusiastic community support for the new school.

Preparation of working drawings and the writing of specifications for the building is the next phase of operations. The architect employs and coordinates the work of mechanical and structural engineers and landscape architects. Frequent conferences are held with the superintendent and the board in order to arrive at final decisions on the plan, the development of the site and the materials to be used.

Architect Supervises Construction

After the contract has been let and construction begun, the architect supervises the work and gives progress reports to the school authorities. In this final stage the architect assists the board and superintendent in the selection of colors, furniture and equipment.

When completed, the new building receives its greatest test—constant use. The creative collaboration of the imaginative educator, his staff and the architect should more than guarantee that educational aspirations have been realized in an excellent building that serves its community well.



Planned by McFadzean, Everly & Associates of Winnetka, Illinois, this stone and timber amphitheatre has many uses for school and community activities.

WHAT SIZE SCHOOL SITES?

by N. L. ENGELHARDT, SR.

Engelhardt, Engelhardt and Leggett, Educational Consultants, New York City

Dr. Engelhardt has been engaged in school building planning activities since 1916. As a professor of educational administration for twenty-seven years at Teachers College, Columbia University, he taught courses in school surveys and school building planning to many who now occupy positions as school superintendents. The firm of Engelhardt, Engelhardt and Leggett has conducted school building surveys and has planned school buildings for over 300 communities in all parts of the United States and in other countries.

STYLES have changed with respect to the sizes of school sites. Fifty years ago school sites were small. The standard of thirty square feet per child, imported from abroad, was frequently applied to elementary schools. Whether this measure was for play areas only or the entire site was variously interpreted. For the location of secondary schools, community centrality was a major criterion. Hence sites for such schools were limited in size because of land costs or lack of unencumbered land.

Acreage was rarely applied as a measure. Educational authorities, as well as their planning architects, thought mainly in terms of compact multi-storied structures and adjoining combination baseball and football arenas with two or three-sided spectator facilities.

Slowly, ideas about the amount of land desirable for school sites began to change during the early decades of this century. Many different factors contributed to these changes. Newly promoted interest in city planning was one. Growing urban congestion was leaving only limited areas for the play activities of children and youth. The training of physical education teachers was being emphasized, and schools became conscious of the need for providing recreational and play opportunities for each individual pupil or student instead of only the few who represented their mates in interscholastic competitions. Lay organizations, with an understanding of the social, physical and citizenship values accruing from wholesome contests in the out-of-doors, added significantly to the advancement of play and recreation movements.

Sites and Changing Concepts

To be sure, changing American popular concepts were also making their influences felt. The success of intercollegiate contests, the industrial movements affecting the length of the working day and bringing changes in family living, and emphasis of the press

upon athletic prowess and successes in the interscholastic games, were some of the many forces creating public opinion in support of more and better play and recreational facilities. This progress was inevitable. It was a resultant of the many significant advances being made in this country.

Professional textbooks prepared prior to 1920 for the training of educational leaders gave little attention to the advantages of education in the out-of-doors. Cubberley,[1] in his 1919 edition of *Public Education in the United States,* did, however, give the following brief historical sketch on play and playground activities:

> Closely related to the health supervision of our schools is the play and playground work of the children, itself also a recent educational development. Probably the first playground organized in the United States especially for children was provided by the Children's Mission in Boston, in 1886. Two summer playgrounds were established privately in Philadelphia in 1893, a sand garden in Providence in 1894 and a summer playground in Chicago in 1897.
>
> The first public playground was organized in Chicago in 1898. By 1911, 257 cities reported 1,543 playgrounds in operation, and 75 other cities known to have playgrounds did not report. The number has increased rapidly since 1911, and today organized play and playground directors are generally recognized necessities in the proper education of children.
>
> At first the tendency was to provide separate grounds and management, under a city playground commission, but within the past eight to ten years the tendency has been to place the direction of playgrounds under the school department of the city, and to organize and schedule play as a regular school subject. The inclination has also been marked, within recent years, to get away from the German type of Turnen exercises, and all highly organized types of group games; to permit of much free play and to use play not only for physical development but also to develop mental and moral qualities, and above all the ability to play the game fairly and to lose cheerfully.
>
> It is this type of play which has done so much for the English boy, and which the German boy has never known. Still more, we now open the playgrounds, under paid teachers and playground directors, after school hours, on Saturdays and Sundays, and especially during the long summer vacation.

Cubberley foresaw a movement that was destined to grow by leaps and bounds. After World War I school authorities tended to increase the sizes of school sites which they acquired. The small and indefensible standards expressed in square feet per child were slowly replaced by acreage allotments for each type of school. A higher degree of cooperation between city recreation and school departments was appearing, with the result that the combination of needs produced larger school sites usable on a prearranged time schedule by both agencies.

Site Sizes Increase

In their volume, *Planning School Building Programs,*[2] Engelhardt and Engelhardt reported on the inadequacy of school sites in all types of communities throughout the country. Their summation of several nationwide surveys made in the 1920's showed a definite

[1] Ellwood P. Cubberley. *Public Education in the United States,* pp. 396-97. Houghton Mifflin Company, New York, 1919.

[2] N. L. Engelhardt and Fred Engelhardt. *Planning School Building Programs.* Bureau of Publications, Teachers College, Columbia University, New York, 1930.

A score card for the size of school sites is suggested in *Score Card for Selection of School Building Sites* by Engelhardt, Engelhardt and Leggett, Consultants, New York.

ITEM		DESCRIPTION	1		2
IV.	SIZE OF SITE				300
A.	Conformity to present and future educational programs	Makes for satisfactory educational use and for educational expansion	50		
B.	Compliance with following suggestions as the minimum in each case	The minimum should be met. Characteristics of locality and costs affect the final decision	150		
	1. Ten acres for an elementary school	Fifteen acres may not be found excessive			
	2. Thirty acres for a junior high school	Present and future junior high school programs make this a defensible minimum			
	3. Forty acres for a senior high school	Acreage in excess of this minimum usually makes a good purchase			
C.	Safeguarding of future educational extensions	The vision in selection encompasses all foreseeable extension needs	50		
D.	Provision for present and future play areas for all groups	Character of land and orientation ensure play and recreational facilities for all	50		

upward trend in school site sizes. Forward-looking communities were beginning to acquire sites of five and more acres for elementary schools, ten to fifteen acres for junior high schools, and frequently twenty acres and sometimes more for senior high schools. In the late twenties such high school developments as the following illustrations were adding impetus to the program of securing more land for educational purposes:

Greensboro, North Carolina
approximately 120 acres for an educational center

Winston-Salem, North Carolina
85 acres for a secondary education site

Trenton, New Jersey
36 acres for a high school

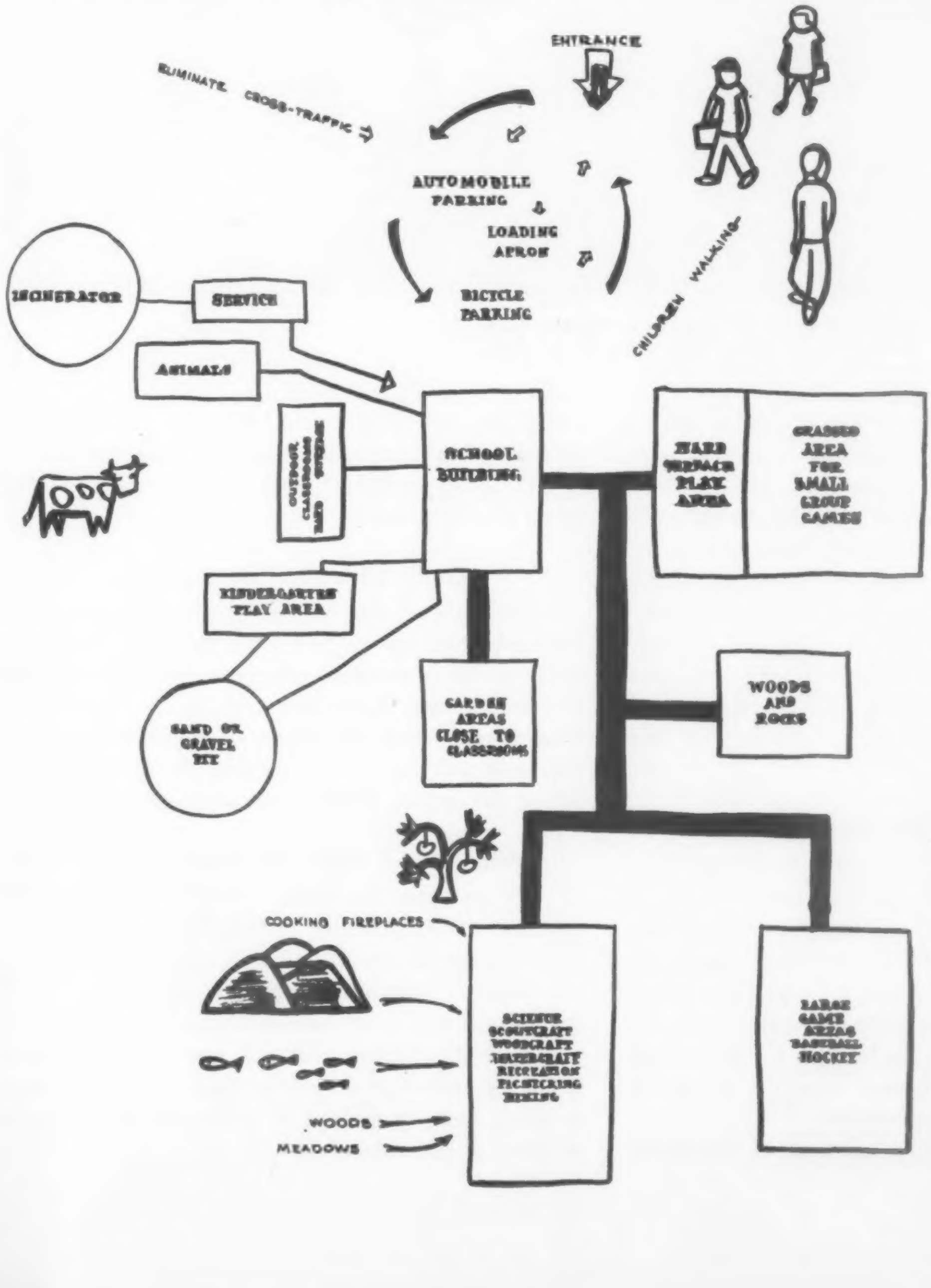
Palo Alto, California
50 acres for a high school

Johnson City, Tennessee
40 acres for school and playground

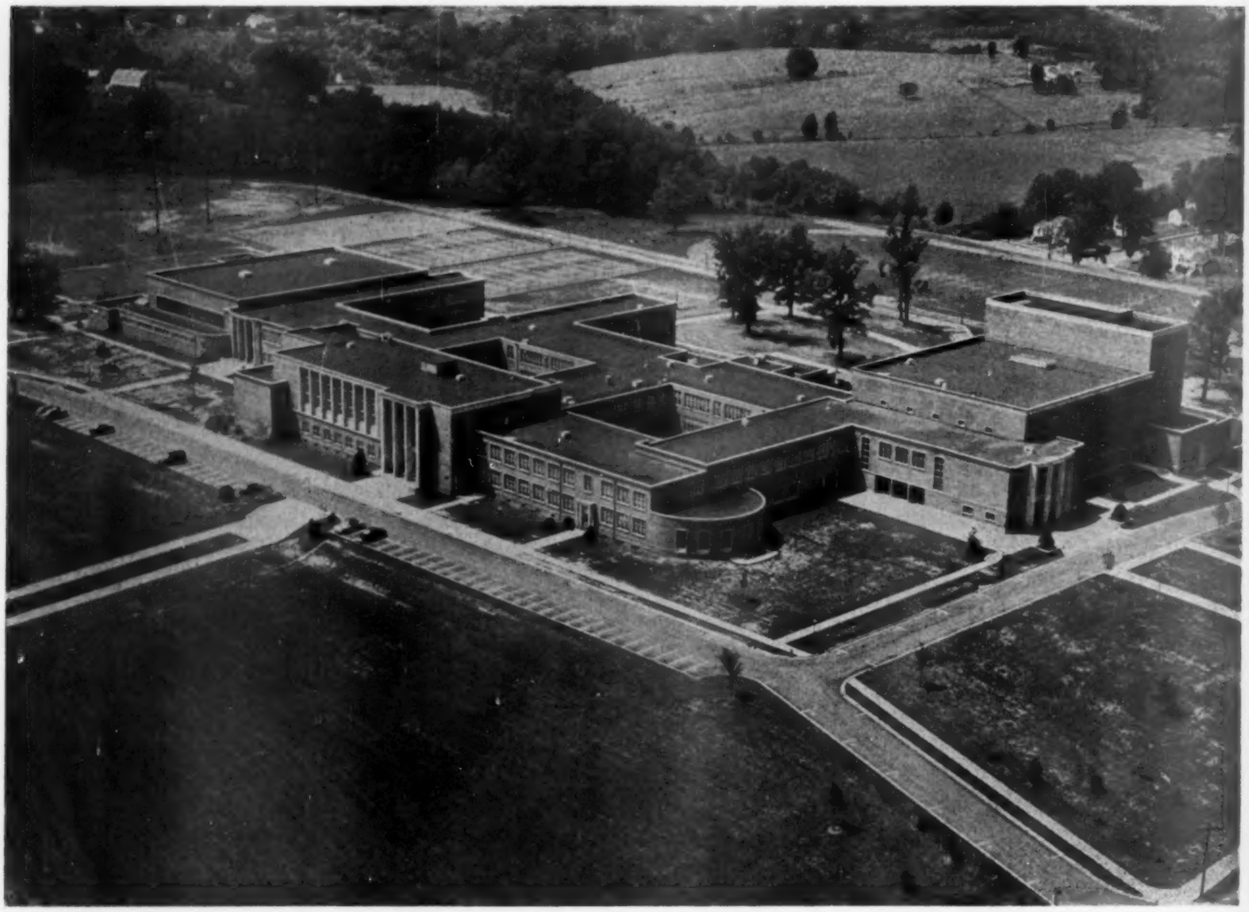
The transition from high school sites of less than 10 acres to those of approximately 20 acres and then to sites of 40 and more acres has been taking place over a period of more than forty years. Today there is wide acceptance of 40 and more acres for high schools, as evidenced by the large number of boards of education, widely scattered, which have taken action accordingly. In 1955 many illustrations can be found where boards of education have acquired 50 to 100 acres for their high school developments. The underlying reasoning leading to this end is readily comprehensible.

Good Sites Enhance the School

Play and recreation programs have become fully accepted as integral parts of the day school program. There is no fixed plan or procedure that can freeze the size of the school site. What frequently happens is something like this. The first unit of a school is built.



A functional diagram for an elementary school site shows the relationships of the various outdoor and building areas. A circular drive eliminates cross traffic and is directed away from the site entrance for children who walk to school. There is ample provision on the site for a hard surface play area, a grassed area for small group games, a kindergarten play area, a sand or gravel pit, a garden section close to classrooms, woods and rocks, a section for large games—baseball, hockey, etc., and woods and meadows reserved for cooking fireplaces, scoutcraft, woodcraft, watercraft, recreation, picnicking and hiking.



Even two story school buildings require large sites. The Lynchburg, Virginia, Senior High School, Pendleton S. Clark, architect, has playing fields and room for autos.

The site size seems adequate for the beginning enrollment. More children seek admission. A second, and even a third, building unit is provided. This restricts the play area and adjoining land may be encumbered with homes and tends to become prohibitive to buy.

The purchase of more land is therefore not made and the school building begins to appear unsatisfactory to parents and school officials. An adequate acreage, purchased when prices are low and with emphasis upon all-time future protection, makes for a good school setting and enhances the desirability of the building itself.

Extended Use of the Out-of-Doors

Educators have gradually been increasing their use of the out-of-doors for different types of educational experiences for their students. The out-of-door classroom adjacent to its indoor counterpart, the drama circle in the grove, the hydroelectric dam on the school stream and countless other natural centers have the sky for their roof and only the horizon to limit imaginations. Land is basic to human living; it is equally important for a school's advancement.

Small sites imply narrow concepts of education. Large sites are rarely found to be too large. Once acquired, a large acreage tends to be defended by the many. Each year may witness gains in use by the addition of a worthwhile educational feature.

Small Sites and Their Locales

Small school sites lead to congestion in the neighborhood. Open spaces best serve the needs of growing children. More and more parents seek the open spaces for their homes. Their increased leisure time enables them to enjoy the advantages of the out-of-doors and they seek such experiences for their children. The large school site makes this purpose achievable.

Why 10-15 Acres for Grade Schools?

Today most elementary schools are of one story construction. Fifty to sixty thousand square feet of floor area uses up land with its courts and setbacks.

Today's school requires play provisions for all grades and both sexes from kindergarten upward. It is a logical requirement that will use up land. Playing is not just throwing or batting a ball. It may be digging in sand, walking through a wood, planting a garden or playing jack-straws.

Today's school requires parking areas. The limited playground of small school sites is frequently assigned for parking teachers' cars.

Acreage surrenders rapidly to building, play, parking and community activities. A reserve of a few acres always saves the community from further worry about costly additions or from seeking another site where no desirable one may exist. Ten to fifteen acres are easily defensible for an elementary school attended by twelve classes or more. And remember, the smaller school may soon reach twelve classes or more.

Why a 50-Acre Site for High Schools?

Even secondary school buildings are today generally one story structures because of safety, economy and educational advantages and, therefore, they use more land. In modern schools a portion of the site should be set aside to meet unknown needs that are bound to arise in the future. This is suggested because schools constructed some years ago tend to become obsolete and lack enough additional site to make possible an economical cure. Buying a large site is insurance against an educational obsolescence that probably has destroyed more investments in school buildings than fire.

The old "small site" high school provided a football stadium for varsity athletics and made little or no provision for athletics for all students. Physical education should be vigorous and all-inclusive, involving entire classes and operated on standard dimension fields and courts of many kinds. After school recreation and training programs require large amounts of open space.

Site plan of the West Springfield, Massachusetts, Junior High School shows the athletic fields placed away from main buildings. Warren H. Ashley, architect; Charles A. Currier Associates, site planners.

The physical education program outdoors should be far enough away from the building so that noise does not interfere with quiet classroom work.

Parking of automobiles for community functions, staff cars, student cars and the like, should be cared for on a planned section of the site. Where heavy community use of facilities is anticipated, tomorrow's parking needs will be beyond expectations. In secondary schools a start has been made in moving some parts of the educational program outdoors. Art and music groups can use the natural environment of the school in good weather.

The sciences should have ample space for experimental growing areas, nursery developments, hydroelectric projects, aquatic laboratories and the like. These are ways of utilizing the cheapest educational space that can be purchased. Auto driver training, for example, is best carried out by providing a training space on the grounds. Here students learn to develop competence before going onto the public roads.

A large site ensures the possibility of the desired setback from the street. It provides protection on the sides and rear of the acreage from student intrusion on the land of neighbors.

A Trial Analysis

Let us try an analysis of acreage needed for a new high school. The figures given here are approximate. We shall assume a one story building with a sufficiency of open space to protect natural light and air and to avoid conflicting noises. The parking problems of the high school are mounting daily, for cars require 300 square feet each and every Tom, Dick and Harry has his car.

Trial Analysis of Area Required for the Site of a New High School

Area for School Building .... 5 acres

The actual floor area of the school may be from 100,000 to 200,000 square feet or from $2\frac{1}{3}$ to $4\frac{1}{2}$ acres. Since the building cannot be one block but must be designed for light and air for students, 4-5 acres of occupied space is conservative.

Reserved for expansion of building ..... 3 acres

Total 8 acres

Field Game Areas for Physical Education and Recreation

1. 175,000 square feet for boys provides areas for soccer, football or touch football, baseball, softball, speedball and other games.

   For example, 110 boys playing touch football, using 11-man teams,

will require 5 touch football fields which are about half the size of football fields. Each field requires 28,800 square feet, or a total of 144,000 square feet. To provide buffer areas between game areas would mean the utilization of the entire 175,000 square feet.

2. 175,000 square feet required for girls, to include the following sports: volley ball, field hockey, soccer, softball, archery.

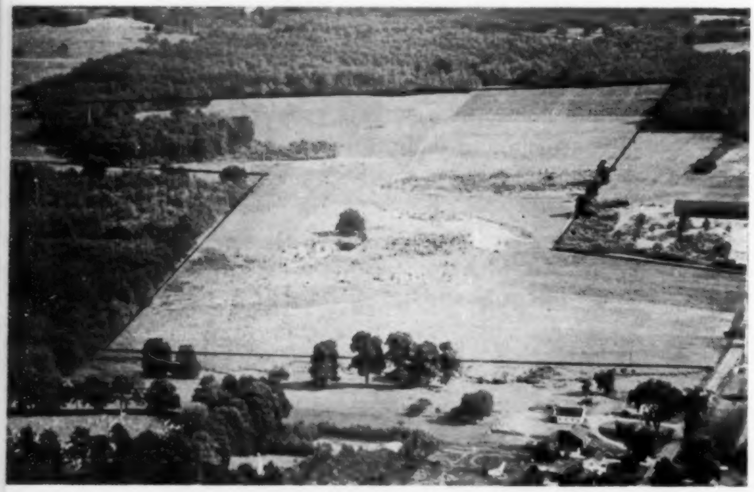
   Again, softball for 100 girls would require 25,600 square feet per group of 20 or approximately the same as touch football for boys, since a greater allowance must be made for protection back of home plate.

   350,000 square feet total area, or 8 acres

Paved Game Areas

This is multi-use area that could include two outdoor basketball courts, two smaller courts and four tennis courts.

Space required—64,000 square feet or 1½ acres



The Town of Somers, Connecticut, expects the arrival of many new home owners when bridges across the Connecticut River are completed. The Board of Education, anticipating this growth, has acquired 100 acres for its future senior and junior high school development.

Areas Required for Service or Protection of Building and Occupants

Setback—100 feet from street Sidewalks and approaches Driveways	2 acres
Parking areas, including access and buffer	4 acres
Landscaping and buffer areas, at side and back of site	2 acres
Playground or mall near building for lunch and rest periods	2 acres
Total	10 acres

Out-of-Door Educational Areas

Outdoor classroom space adjacent to classroom, such as art room	½ acre
Out-of-door areas adjacent to shops	½ acre
Auto driving instruction	4 acres
Pageantry and outdoor theatre area	1 acre
Gardens	1 acre
Outdoor classroom areas for biology, study of plant life, nursery operation and the like	5 acres
Total	12 acres

Summary

Building Area	8 acres
Field Game Areas	8 acres
Paved Game Areas	1½ acres
Areas for Service and Protection	10 acres
Outdoor Educational Areas	12 acres
Total	39½ acres
Unassigned areas held in reserve for future use	10 acres

For example, no stadium has been included above. This requires 10-12 acres depending upon the amount of parking provided.

Grand Total	**49½ acres**

What Size School Site?

The answer to this question has only been partially given. There is no standard answer any more than there is to the size of man. An answer given in simple units like 100 square feet per student is unrealistic and even deceiving. Per student of what? The first enrollment or that of fifty years hence? An answer hidden in a formula might be right and then again it might not. Size of site is not so much a function of numbers as it is of the kinds of activities and programs that today and the future may present.

The preferred answer seems to be to buy liberally when acquiring new school sites. Wise school authorities rarely sell any parts of school sites once acquired. On the other hand, large sites well used tend to bring about additions for the increasingly great number of educational and community interests to be accommodated.

Elsam, Mann & Cooper

The primary school in Bolton County, England, was built in the traditional style with a steel frame and glass cladding. The building was placed to harmonize with the well wooded site. (Courtesy of the Bolton County Borough Council.)

RECENT DEVELOPMENTS IN BRITISH SCHOOL BUILDING

by ANTONY PART

Under-Secretary, Ministry of Education, London, England

After graduating from Cambridge University in 1937, Antony Part served in the Board of Education, the Ministry of Supply and the Army. Since his return to the Ministry of Education in 1945, he has been principal private secretary to the Minister, head of the Building Branch and head of the Schools Branch. In 1950-51 Mr. Part traveled widely for a year in the United States, studying school buildings.

FOR the last ten years Britain has been engaged in the largest school building operation in her history. Between 1945 and 1955 the number of children in school in England and Wales grew from five million to six and a half million, an increase of 30 percent. During the next five years the rate of increase will slacken but, nevertheless, by 1960 the total will have reached six and three-quarter million. After that it will probably fall.

The peak numbers will be in 1956 in the primary schools and around 1961 in the secondary schools. Alongside these rises in numbers there is a massive housing program in progress which intensifies the need for many new schools.

For the first ten years after World War II educators and architects were straining every resource to provide enough primary places to accommodate the rise in numbers of pupils and the shifts of population. Now the emphasis is switching to secondary schools, and in 1955 about 100,000 new primary and 100,000 new secondary places will be provided. A start has been made, too, on the improvement of the many old and unsatisfactory school buildings still in use.

The schools are designed by the 146 local educa-

K. & S. Commercial Photos Ltd.

A primary class at Loughborough, Leicestershire, attends to many different tasks. (Courtesy of the Leicestershire County Council.)

tion authorities or by private architects whom they employ. In the last few annual programs some 70 percent of the projects were designed by the salaried architects of local education authorities and 30 percent by private architects.

The Government's Role

The central government, however, sets the size of the national school building program each year and it has been the first aim of Government policy, whether the Government has been Conservative or Labor, to ensure that enough places shall be available for all children of compulsory school age, and that no double shifts shall be necessary. So far, this aim has been achieved.

Against this background, what have been the main developments? First, the study of children. Schools are buildings for children and young people. (Who would think so, to look at some of them?) Unless we know what children and young people are like, we will not be able to design a good building where they may work and play and learn the social graces.

This means something more than giving them furniture and equipment of the right size. It means looking at buildings through the eyes of a child and studying their scale, their colors, the atmosphere they create. "We shape our buildings," said Sir Winston Churchill, "and afterwards our buildings shape us." If one were to single out a particular merit in English postwar buildings, it would be, I think, their general atmosphere.

There is now a wider appreciation than there used to be that it matters how a school building fits into its surroundings, that the whole environment—including grass, trees, flowers and playing fields—is important, that a school is neither an army camp nor a municipal institution. Most of the schools built in Britain since the war say to the child who enters them not, "Beware" but, "Welcome."

A bronze group by Daphne Hardy Henrion, Tobias and the Angel, stands on the school grounds of the St. Albans Primary School in Hertfordshire. (Courtesy of B. H. Cox, Ministry of Education.)

First, then, one studies the children. Next, one

Each child in the Bolton County Primary School has storage space in the standing units. The dividing partition between the two classrooms is open. (Courtesy of the Bolton County Borough Council.)

Elsam, Mann & Cooper

studies the work they do. Take children five to seven years of age; in Britain today they spend very much less time than formerly sitting in serried ranks. They do nearly all their work in groups of five or six so that, for example, the faster readers do not have to read the same books as the slower readers. The teacher moves about from one group to another, seeing that work is properly under way. In a typical day the children will have used books, arithmetic equipment and modeling material or paints.

Changes in Furniture

This points to the need for tables rather than desks: they must be movable, and the chairs must be stackable because space may be needed, for instance, for acting out a story. And it does not follow that the whole classroom has to be on the same level. Hence, an increasing demand, following the United States trend, for classrooms of 600–800 square feet instead of the 520 square feet common hitherto.

Then there is the need for a central space of some kind in a school for such young children. What will they do there? Would it be better to dispense with it and add still more extra space to the classrooms? Most people do not think so, but one local education authority is trying out the idea.

For the juniors (aged seven to eleven) no very striking new ideas have yet emerged far enough to be described in this article. But in all primary schools there is now a strong trend, only partly dictated by economy, towards compact buildings with a minimum of space (not more than, say, 5 percent to 7 percent) used solely for circulation. Schools of this kind are very homelike. There is a friendly, informal atmosphere about them which is most attractive. With their ample daylight, bright colors, well designed furniture, pictures, mural decorations and flowers they represent one reason why most children nowadays like to go to school.

Secondary School Progress

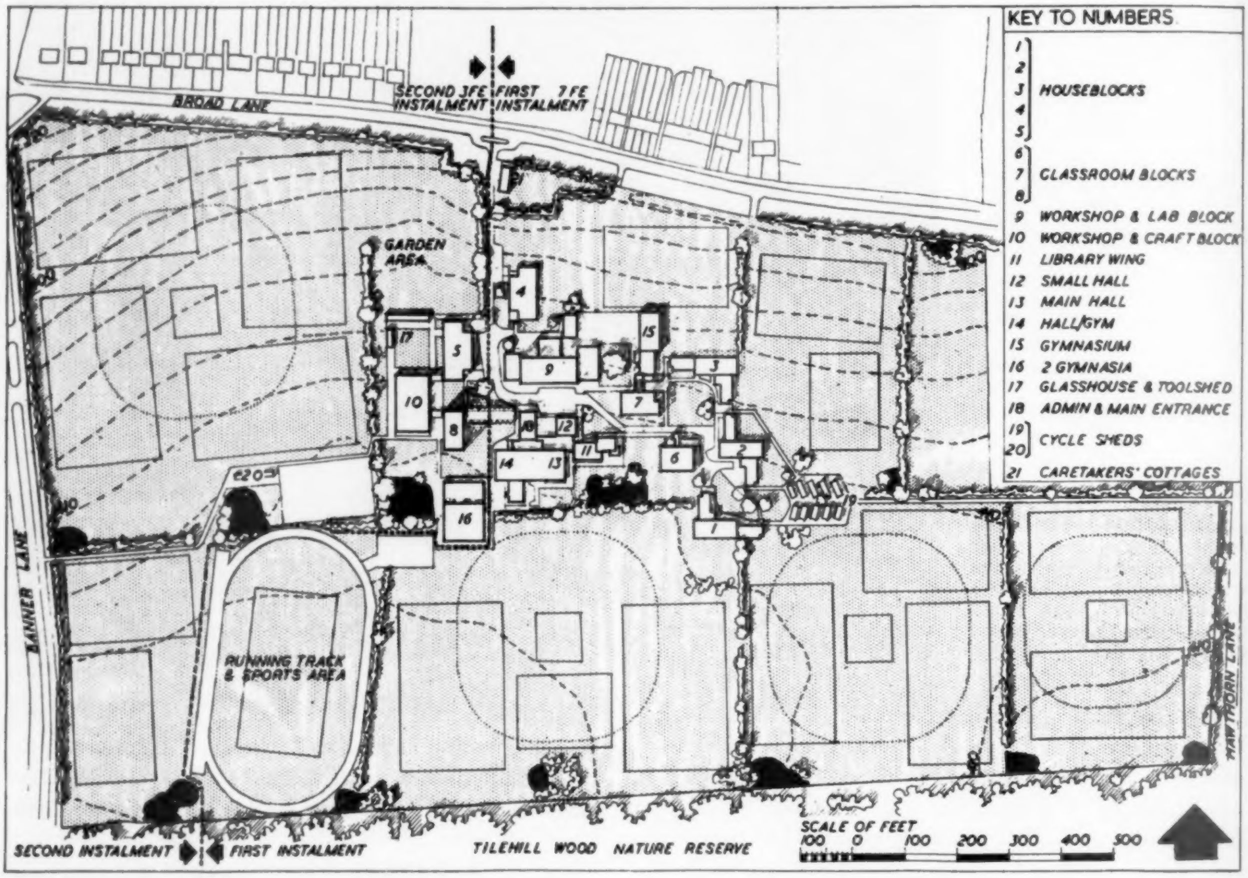
Secondary schools are a more complicated proposition. But, here again, as the Ministry of Education's Building Bulletin No. 2 illustrates, the same analytical or problem-solving approach has been adopted. There are perhaps two principal developments which might be of particular interest in the United States.

The first is an idea for the general layout of a large secondary school. The project from which the idea arose was in English terms a "comprehensive school" called Woodlands, for about 1,500 pupils of eleven upwards, in the industrial city of Coventry. The nearest American equivalent would be a junior high school.

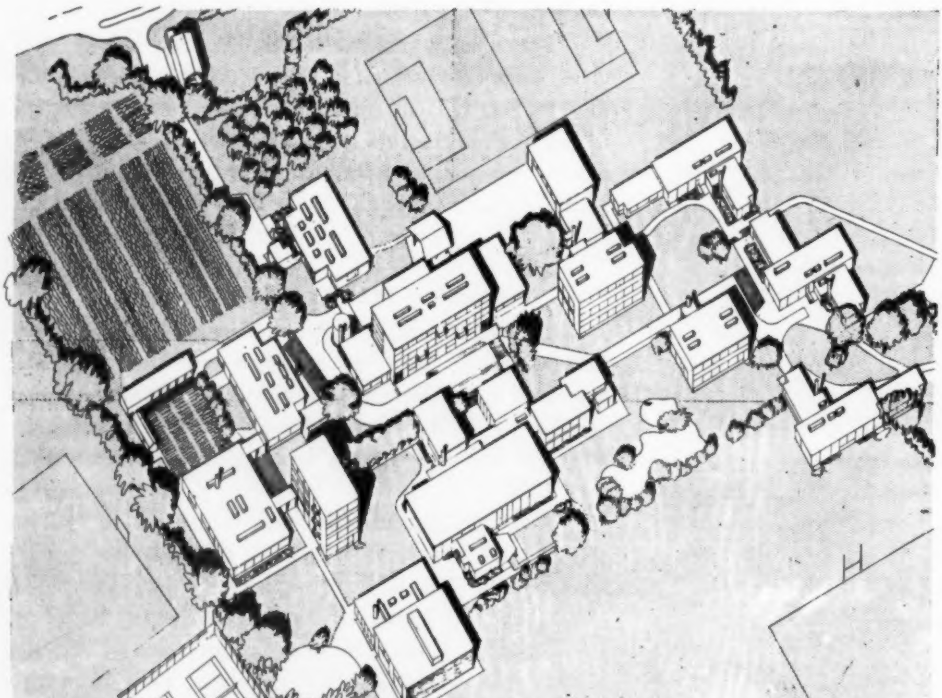
Planning the Woodlands School

The main British tradition is for schools of 500 to 600 pupils. So there was much concern that, if a considerably larger school were needed, it should not lose the family feeling and the personal touch which in England are regarded as vital elements in education at school.

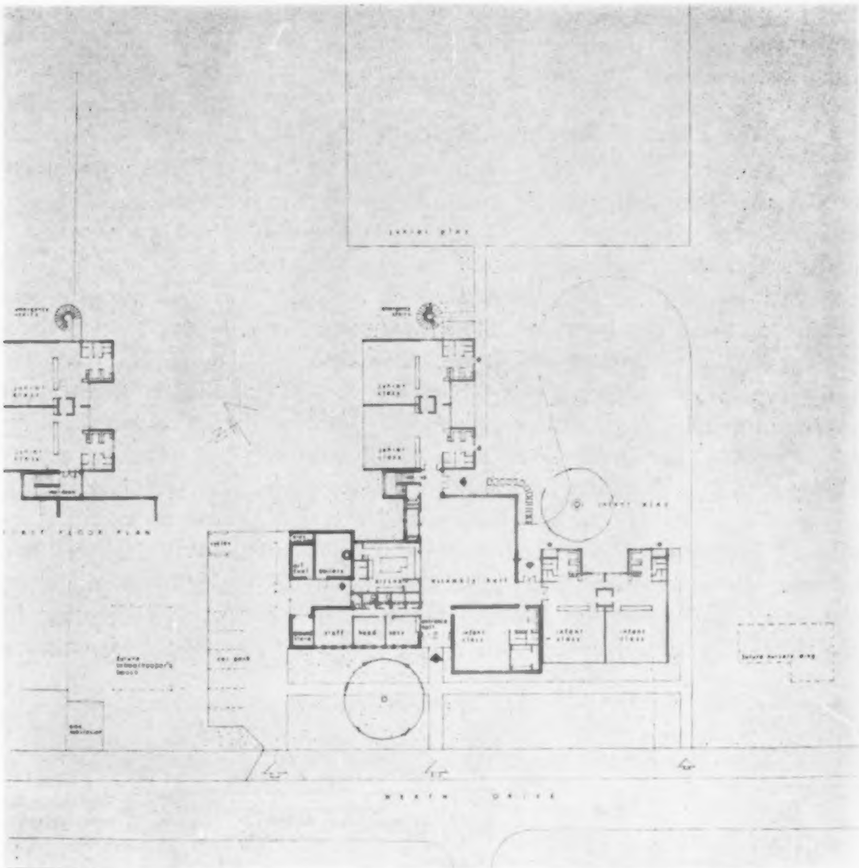
The architects reached back to the British "public school" and, it may be remarked, across to the American campus. The solution suggested was to break the school up into several small buildings, largely based on the "house" system common in British boarding schools. Each house would have 150 members. They would go to their house when they arrived at school in the morn-



The Woodlands School is a secondary school planned for the industrial city of Coventry. The anticipated enrollment for the school is to be more than 1,500. The school was designed as a campus plan with individual "houses" for 150 students. The "house" system is common in British boarding schools.



The general layout of the Woodlands Secondary School in Coventry has, as a focal point, the building which contains the assembly hall, gymnasium, the headmaster's and staff rooms and the library.



The Theydon Bois County Primary School was designed by H. Conolly, county architect. The plan includes four junior classrooms, 900 square feet in size; two infant classrooms, 900 square feet in size; one infant classroom, 780 square feet in size; an assembly hall; the school head's room; a staff room; a kitchen; and an additional room for the senior assistant, secretary and medical inspection. The primary section is one story, the section for older children is two story. (Courtesy of the Essex County Council.)

ing; they would have their lunch there and some of their lessons. The house would be the headquarters of the teacher responsible for their welfare.

For subjects needing specialized equipment, such as science, handicraft or homecraft, they would go to the buildings set aside for these purposes. For assembly or physical education they would go to a building bigger than the rest which would form the central core of the community and be its architectural focus.

The general layout of the school, then, would be to have as the focus a building which contained the assembly hall, a gymnasium (which could be used in association with it), an outdoor theatre, the headmaster's and staff rooms, a library, etc. The idea was to make this building the main social center of the school, and architecturally to regard it as a unifying influence, not only for the teaching and house accommodation, but also for the principal playing fields.

Thus, on one side, this building was to face out on the principal playing fields and form a grand pavilion from which major school events could be conducted and viewed; while, on the other, the teaching blocks would radiate around it in one arc and beyond that the house blocks in a second arc.

What About Price?

The question was: could all this be done at an acceptable price? The British system allowed this to be tested. For every type and size of school a limit of cost is set by the Ministry of Education at levels which are a result of the Ministry's own research and development work. They are known to be practical but difficult costs to achieve except with maximum economy in space and a high standard of building practice. The protagonists of a campus layout knew before they started, therefore, the price to which they would have to build if they were to compete successfully with a concentrated building and secure the Ministry's financial approval.

It turned out that the project was feasible and that, for example, the feeding of pupils by "houses" could be organized as cheaply as feeding them centrally.

The End Result

The result, in British eyes at least, is an environment which is not only efficient but is on a suitable scale and has a pleasantly human atmosphere. The buildings are imaginatively placed on the site and good use is made of trees, grass and flowers.

Few British secondary schools have as many as 1,200 to 1,500 pupils and of those that do, some, like the London County Council's Kidbrooke comprehensive school (which has become known abroad), are on sites that do not permit a campus plan. So the number of schools like Woodlands is small, but it is mentioned

here because the problem it seeks to solve seems to be rather like some of the problems encountered in the United States.

The Effect of Teaching Methods

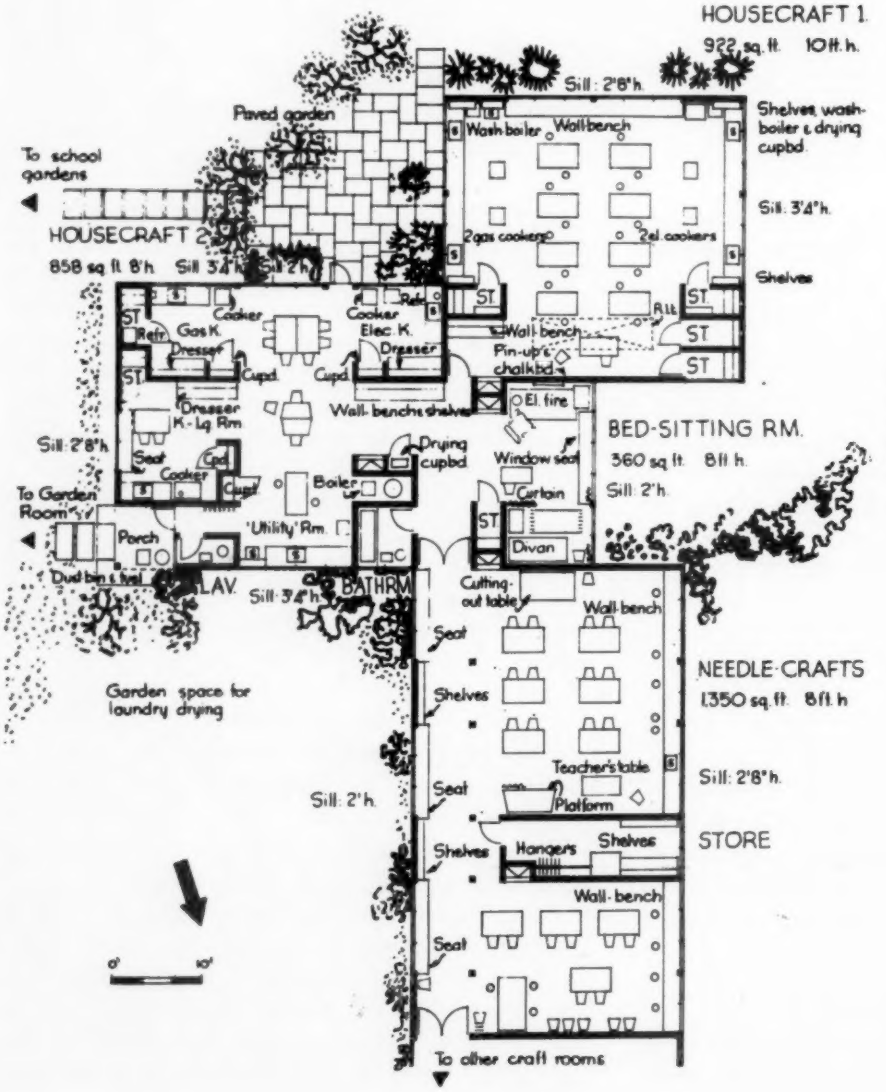
The second main development is the close attention to the effect that teaching methods should have on the design of schools. This has been a perpetual postwar text in Britain: the need for teachers and architects to get together and, specifically, for the architect's educational clients to give him a clear statement of their requirements in a form which clarifies the educational purposes and needs of a school, but does not restrict him in his physical interpretation of them.

The object is to move away from the British architect who said: "We don't want to worry too much about this education business. What we want is a good school!" But we have to do better than the American educator who summarized the requirements of her subject by explaining that "in teaching homemaking we use visual aids accompanied by auditory impressions!"

Here is an example from the St. Crispin's Secondary School at Wokingham, designed by the Development Group at the Ministry of Education and described in Building Bulletin No. 8, of the effect on the layout of the homecraft section of the school caused by a study of recent developments in teaching technique.

The Homecraft Unit

One of the homecraft rooms, for the younger girls aged eleven to thirteen, is arranged in the conventional way. But the arrangement for the older girls, aged thirteen to fifteen, is rather different. To suit the teaching methods used for these girls, the layout encourages the breaking up of the class (usually of fifteen for this subject) into small groups of two, three or four. It consists of a central space off which open three different kinds of kitchen and a "utility room" with sinks, washing machine and drying cupboard. There are different kinds of flooring, furniture and equipment to give variety of experience in their maintenance.



The results of a study of recent developments in the teaching of homecrafts are reflected in the layout of the homemaking department of the St. Crispin's Secondary School at Wokingham, Berkshire. The plan is reproduced from Building Bulletin No. 8 of the Ministry of Education.

A mural by Pat Tew decorates a wall in the dining room of the primary school at Welwyn Garden City, Hertfordshire. The mural depicts scenes from the life of St. Nicholas. (Courtesy of the Architectural Review, London.)

In addition there is a small bed-sitting room. This the girls are intended to redecorate and refurnish from time to time and to use for entertaining visitors, for small exhibitions, for study or for a rest room.

The needlework room is next door to the homecraft rooms. What might have been a corridor has been incorporated into the room itself, because any people passing through will be concerned with one or another of the homecrafts and the area is, of course, more useful as a teaching space.

Color Plays a Major Part

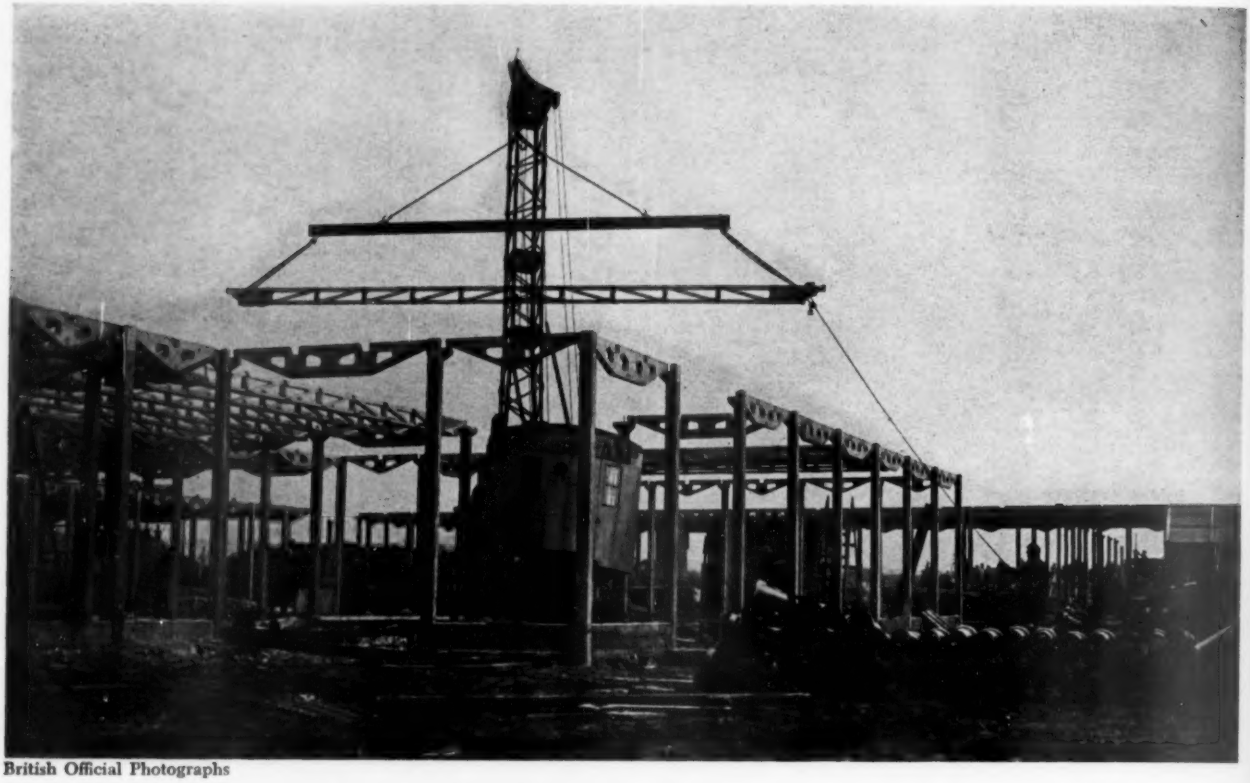
In all this, and indeed in the whole of postwar school building in Britain, color plays a major part. This has been one of the most exciting stories of the last ten years. It is a fine example of the close cooperation of many different interests—teachers, architects, scientists and manufacturers. Architects wanted to make a more imaginative use of color. Teachers supported the idea and advised on the effect of different colors in various parts of the school. But could this be done economically? Could some method be introduced into the hotch-potch of colors produced by manufacturers? Could the effect of color on the lighting of a room be predicted scientifically?

All these problems were investigated and solved. The work is described in "Color in School Buildings," the Ministry of Education's Building Bulletin No. 9, a second edition of which was published in 1955. A vital feature in this story has an Anglo-American origin, for it was the Anglo-American Productivity Council which recommended a big reduction in the number of commercial color ranges. This recommendation led eventually, after intricate discussions which perhaps only people who have taken part in such negotiations can fully appreciate, to agreement among the Royal Institute of British Architects, the British Standards Institution and the paint industry on a national range of 101 colors, described in Munsell notations.

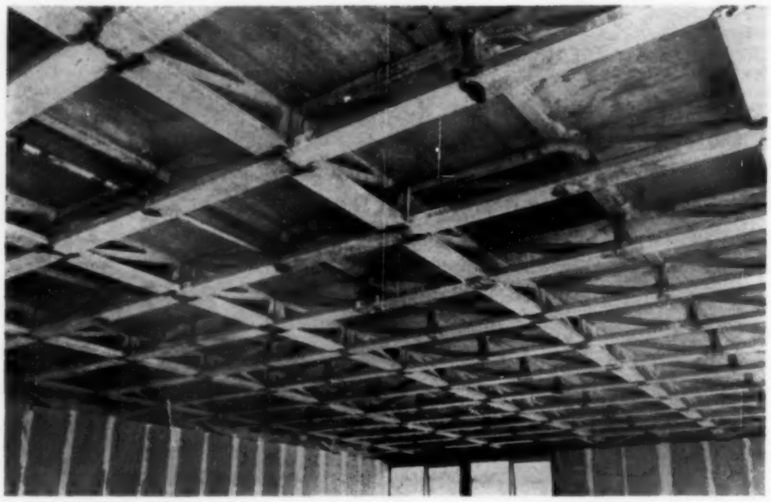
Daylighting Research

Linked with this development are researches into daylighting. The total daylight in a teaching space is, of course, the sum of the direct light from the sky and the reflected light and it is now known that reflected light may account for 50 percent of the total. A technique has been available for some time for predicting the first.

Until recently the second, or rather the total daylight including the reflected light, could only be measured in a finished building or predicted as a result of tests on models. Now a simple but systematic method of predicting the indirect component of the daylight factor has been evolved and published by the Government's Building Research Station. The essentials of the method are described in the Ministry of Education's



British Official Photographs



The Secondary Technical School, Worthing, Sussex, was designed for the Sussex County Council by the Development Group of the Ministry of Education. The building is a prototype of a prestressed concrete, prefabricated construction system. In the photo above the prestressed concrete roof beam, with a 40-foot span and 12¾ inches deep, is being placed into position. Beams are assembled on the ground from standard precast units, 3 feet, 4 inches long, post-tensioned and then erected. The horizontal module is 3 feet, 4 inches in both directions. The underside of the concrete beam grillage (left) shows the dished concrete roof slabs. The ceiling is later suspended from this grillage. The open web enables service pipes to be passed through the structure in any direction. (Courtesy of the Cement & Concrete Association.)

Building Bulletin No. 9, mentioned in the previous paragraph.

Artificial Lighting Developments

Artificial lighting, too, has been worked on. In Britain, mainly because artificial light is used relatively little, tungsten has largely won the day against fluorescent. The main research effort here has been to design light fittings. Until recently light fittings in schools have been fairly costly and not very functional in their design. The objective has been to evolve fittings which are much cheaper than most British fittings but do the job of diffusing light without glare, no less efficiently than the American ones. This too, we think, has been achieved.

A Varied Prefabrication Plan

Perhaps the most striking developments have been in building technique. Compared with the United States, the pace of British building is slow and there is a shortage of building labor. This shortage was foreseen in 1943 and the development of prefabrication was encouraged. This was to be used not, as in housing, for temporary sub-standard structures, but for permanent school buildings equal in quality to any of the traditional buildings.

To design a standard school, or at any rate standard parts of a school, and to arrange for the parts to be prefabricated would have been relatively easy, especially if the school had been single story. But such a solution would have been anathema to local education authorities, architects and Ministry of Education alike.

So the aim has been to encourage the design of a variety of "meccano sets" flexible enough to meet the varied requirements in plan and elevation of educational buildings, suitable for multi-story as well as single story construction, fully up to standard in quality of materials and finishes, and capable of being assembled into schools at a total cost no greater than that of schools in conventional construction.

No extra cost has been allowed for prototypes: the system of "cost planning" described in Building Bulletin No. 4 has allowed the manufacturers to go into bulk production after any necessary tests and without waiting for a prototype to be completed. Because of the ready market, manufacturers have been content to bear any development costs themselves.

Developing the Prefab Systems

At first much of this development fell on two or three local education authorities and the Ministry of Education. Indeed, the major task of the Ministry's Development Group has been to design systems of prefabricated construction suitable for secondary schools. More recently others have entered the field, particularly with designs in timber.

There are now several systems on the market: one with a light steel frame and cladding of thin concrete slabs faced with artificial stone, a second using aluminum for both frame and cladding, and a third with a frame of cold rolled steel and cladding of asbestos cement.

The fourth system, the prototype of which is a secondary technical school at Worthing, Sussex, is believed to be the first example in the world of a multistory prefabricated modular structure in prestressed concrete. It has a prestressed concrete frame and floors and precast cladding.

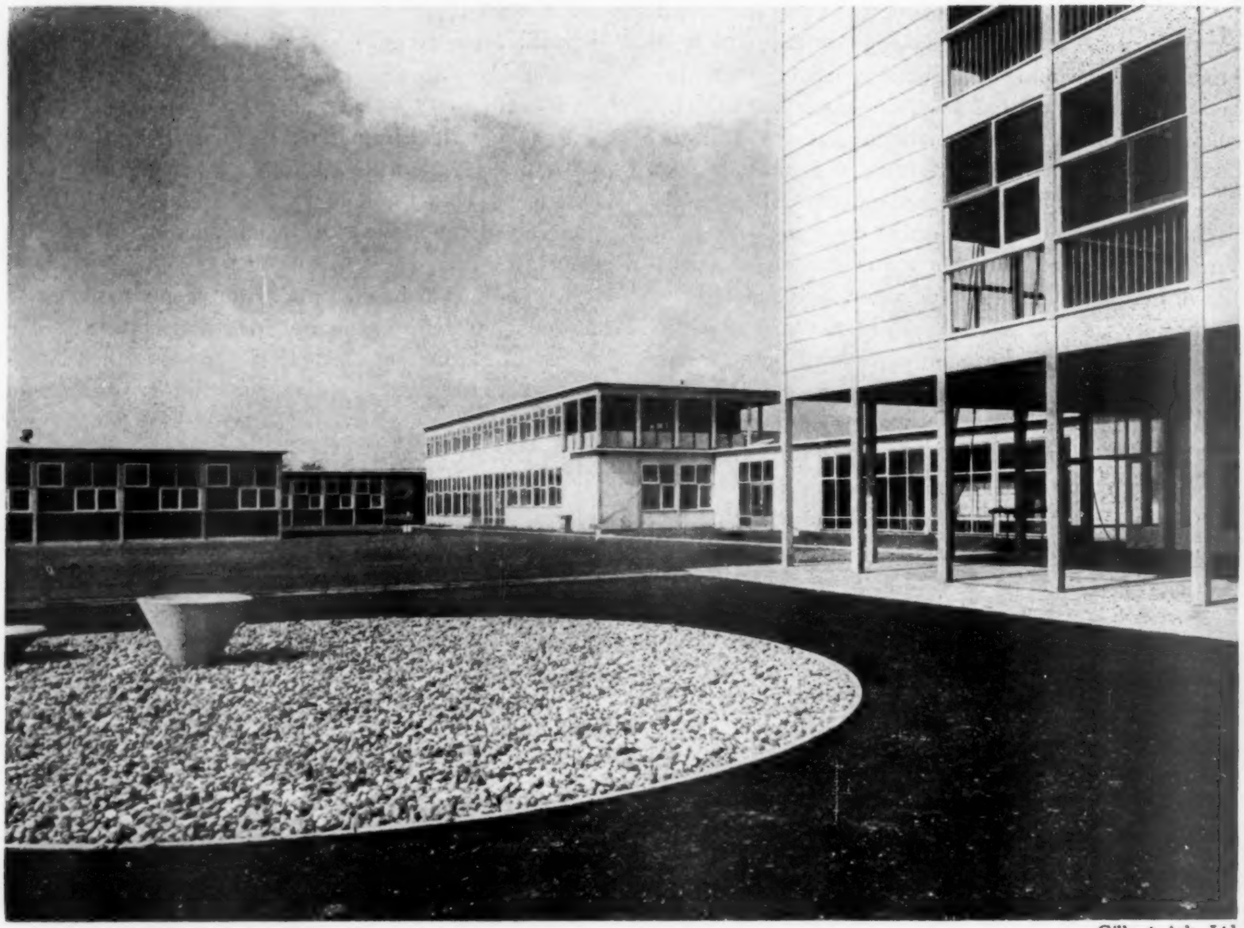
In spite of its adaptability and the fact that it is suitable for buildings up to four stories high, the system contains only twenty-six components (four columns, four column heads, four beam components, two boundary beams, four cladding slabs, five eaves slabs and three precast floor slabs). They are all small factory-cast units, which are assembled and post-tensioned on the site.

The Modules Used

The horizontal module is 3 feet, 4 inches in all these systems, except in the aluminum one where it is

The four story block of the Worthing Secondary Technical School is under erection. Columns are placed in story height as each floor level is completed. Cladding slabs and windows are raised from within the building without the use of scaffolding.

Central Office of Information, London



Gilbert Ash, Ltd.

The Worthing School is shown as the building is nearing completion. The main entrance and classroom section are in the foreground; crafts, workshop and science are at the rear.

4 feet. The vertical module in the prestressed concrete system is 10 inches; in the others it is 2 feet.

The remaining systems are all in timber, using a horizontal module of 6 feet or 6 feet 4 inches, related to the economic width of a timber panel. Not all of the timber systems have a proper vertical module, but those which do have one use 10 inches or 2 feet. Most of the exterior cladding is in hardwood, except in one case where it is in plywood.

Each system has a constant floor to ceiling depth and whether it is steel, prestressed concrete or timber, beams are of open web type. This is to allow services to be run free of the structure anywhere in this space. By making this provision everywhere, services can be installed independently of the builder's work. The resulting savings in time and money have been considerable.

At present the proportion of the British school building program being carried out in prefabricated construction is some 20 percent.

Precautions Against Fire

The systems in timber interlock with another development, investigation into precautions against fire. In single story buildings the problem was relatively simple. The safety of the occupants being the main consideration, elaborate precautions were not necessary; experience during air raids had shown that a typical single story school for as many as 500 children could be evacuated in about three minutes.

Multi-story building was a different affair. Over the years precautions had accumulated, until they could account for a good deal of money. In order to consider the requirements for multi-story prefabricated structures, it was necessary to go back to first principles. This piece of research, the result of close cooperation among fire officers, scientists and architects, led to a rationalization of fire precautions which not only helped prefabrication but reduced costs. As part of this operation, acceptable principles were established for precautions against fire in two story schools to be designed in timber.

Investigation of Heating Systems

The need for economy and the search for efficiency also led to an investigation into heating systems. These can account for quite heavy capital expenditure (between 5 percent and 15 percent of the cost of the

building) and fuel consumption can equal in fifteen years the capital cost of the heating system. The Building Research Station and the Ministry of Education surveyed 160 postwar schools and carried out in one new school a carefully controlled comparison between different heating systems. The results, which indicate important opportunities for savings, were published in 1955 in Building Bulletin No. 13.

The fact that so many of these developments are recorded in bulletins issued by the Ministry of Education does not, of course, mean that all research is done there. It is true that most of the local education authorities are preoccupied with the task of building enough good schools of the right size at the right time at the right cost. But some, particularly the Hertfordshire County Council, have initiated important developments themselves, and many others have cooperated with the Ministry in the researches which have led up to the building bulletins.

The Ministry Building Bulletins

These bulletins* are a new and important part of governmental technique. They contain not requirements but suggestions. Their recommendations are always cast in the form of principles or methods of approach, not of standard plans or detailed dimensions. It is in line with this technique that, at the Ministry's request, the British Standards Institution is now engaged in research designed to substitute performance tests for the specifications of the most common items of school furniture, recommended by a central committee some ten years ago.

The building bulletins do not stand alone. They supplement the building regulations made by the Minister of Education (The Standards for School Premises Regulations 1954), which are statutory. But even in these the emphasis is on the result to be achieved, not the method of achieving it. For example, the regulations prescribe the amount of daylight needed in classrooms and the performance required of the heating and ventilating systems; they do not prescribe the height of the ceiling.

Much trouble has been taken to work out a good relationship between central government and the local education authorities. Central government prescribes the standards to be achieved and the maximum cost, and examines the plans to see that these two requirements are met. But its formal action goes no further. It does not prescribe the shape of the rooms or their size or, strictly speaking, their number.

An Advisory Service

Its main effort lies, however, in its advisory service, provided by the same architects and administrators who operate the formal controls. Before the war this service depended for its authority on the evidence gained by the Ministry from studying and comparing plans submitted by local education authorities throughout England and Wales. Now, in addition, it rests on the research and development work done by the Development Group of the Ministry.

This work consists not only of cooperation with Government and other agencies but of the design of schools built on the same financial basis as those of local education authorities. In fact, all seven of the schools so far built or being designed by the group are chosen from the normal annual program of a local authority. The usual arrangement is that the group is paid the same fee as would be paid to a private architect doing the same work.

The Building Research Station

In all this the Building Research Station plays an important role. It is part of the Government's Department of Scientific and Industrial Research. It acts as a focus for all aspects of building research, thus enabling, for example, research into problems of structure, fire and noise to be effectively coordinated. This is the sort of work which is seen in Britain as a constructive function for Government to undertake.

Meanwhile, the local authorities and the salaried and private architects who work for them are encouraged to use their initiative to the full. The result is a great variety of design, more perhaps than at any previous period.

The Last Ten Years

How should one summarize the last ten years? From 1945 to 1949, there was a determination to take the measure of the problem and to foresee the size of the building program needed over the next fifteen years. During these years there was a building up of the administrative and architectural machine to do the job. Shortage of materials dominated design. But the program got under way. In 1946 the local education authorities started almost no school building. In 1949 the building program for the year totaled nearly 1,000 major projects.

In 1949 the administrative procedure was streamlined, the Development Group was set up at the Ministry of Education and a campaign for value for money was begun. Since then, researches have enabled the

* The following is a selection from the list of Ministry of Education Building Bulletins. They are all obtainable, at the prices indicated (which include 5 cents for postage), from British Information Services, 30 Rockefeller Plaza, New York 20, New York.

1 New Primary Schools (Second Edition 1955)	41 cents
2 New Secondary Schools (1950)	50 cents
2A New Secondary Schools (Supplement) (Second Edition 1954)	68 cents
4 Cost Study (1951)	23 cents
5 New Colleges of Further Education (Second Edition 1955)	59 cents
7 Fire and the Design of Schools (Second Edition 1955)	50 cents
8 Development Projects: Wokingham School (1952)	68 cents
9 Color in School Buildings (Second Edition 1955)	77 cents
10 New School Playing Fields (1955)	68 cents
13 Fuel Consumption in Schools (1955)	41 cents

average cost of schools to be reduced by as much as 50 percent. If this had not been done, there would by now be many children out of school.

Standards Are Higher

The standard of school design in Britain today is certainly higher than it was five years ago. Much of the improvement is due to the skilled and lively work of the younger generation of architects, who have welcomed the challenge of economic circumstances. They see in them an opportunity to establish new building techniques and approaches to design and to express the requirements of educators more sympathetically than they believe to be possible with earlier methods. The educators, too, have gradually learned how to cooperate effectively with architects and how to distill into meaningful descriptions the educational methods used in schools today.

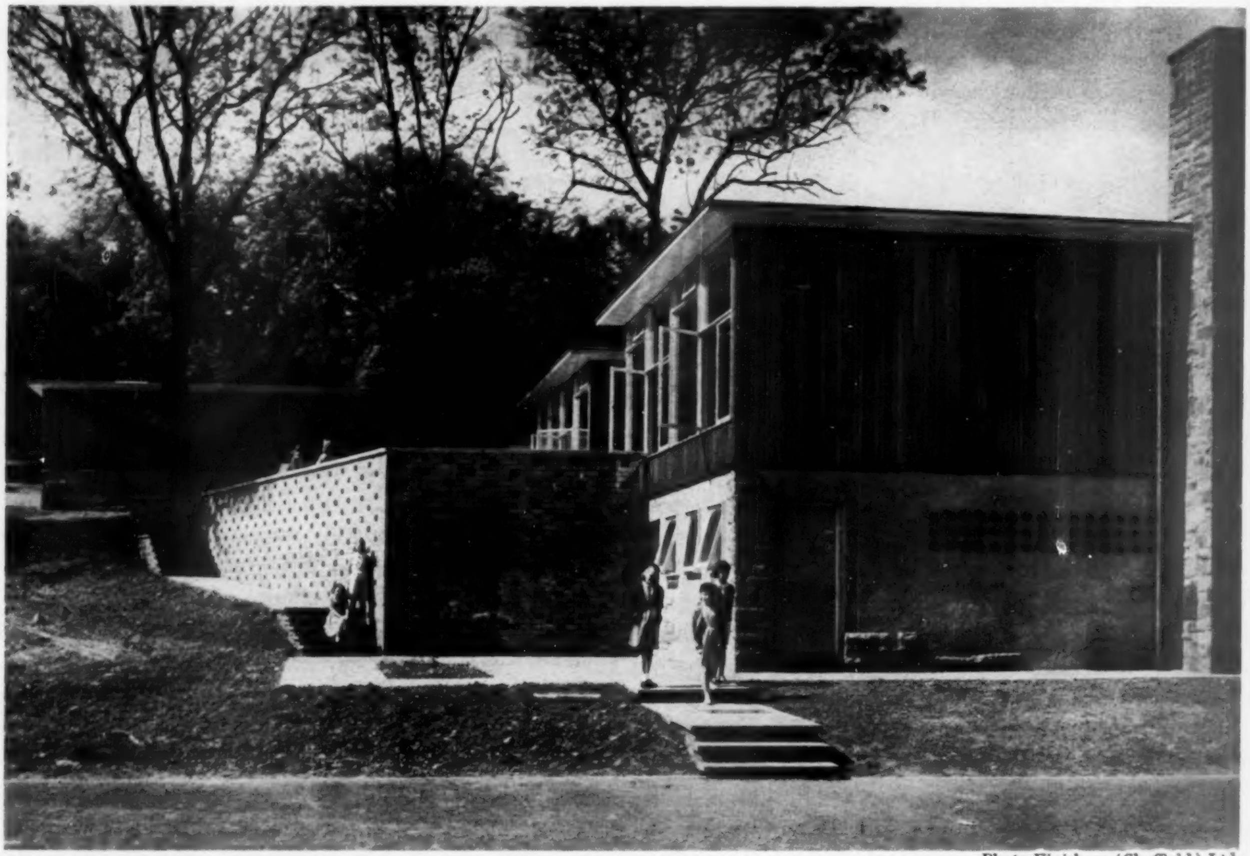


Photo Finishers (Sheffield) Ltd.

A British prefabricated timber primary school blends with the wooded beauty of its attractive site. The timber prefabrication system and the school were designed by S. Morrison & Partners. Construction was by Vic Hallam Ltd. of Nottingham.

There is still a long way to go. No one concerned with school building in Britain is complacent. But anyone from abroad who expects to find among postwar British schools the psuedo-Tudor or even the neo-Georgian would be well wide of the mark.

Not all the new efforts are successful. To a lay eye the modern architect, with so many possibilities at his command, often does not achieve a satisfying synthesis. Reacting from the rigid architectural grammar of the Georgians and shunning perhaps the over-decoration of the Victorians, his buildings may seem to lack the elegance and proportion of the one and go to the extreme of featureless austerity to avoid the other.

But this is no more than the slightly ill-informed criticism desirable to sustain an effective working relationship between educators and architects who are friends at heart and allies in a common cause!

School Buildings for Children

A layman may also be allowed to say that the best of British postwar schools, like the best postwar schools in the United States (how many affinities there are between them!), are not only efficient for their purpose, but are pleasing to the eye and have a lightness, color and gaiety seldom present before the war.

The problems posed in their design, investigated with the help of science, have been solved with the help of art. These buildings are constructed down to a price and up to a standard. They are the products of many skills and much teamwork. Above all, perhaps, they are not municipal monuments; they are buildings for children.

Kenmore Elementary School, Bothell, Washington, has 20 toplighted classrooms, consisting of one 8-classroom unit, two 6-classroom units, an administration unit and a multi-purpose unit. The classroom wings of the building, designed by Ralph Burkhard, are steel frame with open web steel joists and have plastic ceilings beneath the skylights.

REVIEW OF SCHOOL ARCHITECTURE IN THE NORTHWEST

by RALPH BURKHARD

Architect, AIA, Seattle, Washington

Mr. Burkhard has a Bachelor of Architecture degree from Syracuse University and a Master of Architecture degree from Massachusetts Institute of Technology. He worked in various architectural offices in New York City and Washington, D.C. He also participated in work on the Pentagon building and was employed by Boeing Aircraft. Mr. Burkhard has been practicing architecture in Seattle since 1945 and the major part of his work has been the designing of schools.

THE end of World War II found the Northwest in a situation not unlike that of many other areas, with a swollen population, seriously rundown and obsolete school buildings, some 76,000 children double-shifting and many others housed in a great variety of substandard classrooms. The bulk of these facilities stemmed back for inspiration to the dark ages before the depression, little having been accomplished in the intervening fifteen years.

The newcomers who swelled the population ranks of the Northwest represented new blood from all parts of the country, bringing in a rich mixture of thinking and ideas. They were the people who could stand the pressure of change of locale, who were able to leave their old homes and relatives, twentieth century pioneers come to help build up this new territory. The variety of their backgrounds precluded the possibility of too many standard prejudices.

Since many things had to be newly created, there was an opportunity for great development. The new population members are not lacking for children, and they are seeing to it that sufficient funds are raised for educational purposes. Efforts are being made at all levels, particularly the state level, for democratic participation in providing sufficient facilities for good education.

In the State of Washington

The population of the State of Washington has increased about 100 percent since 1940. The need for expenditures for school construction is many fold over what had ever been dreamed of before—approximately 360 million dollars for the twelve years from 1953 to 1965. Partly because of a Washington State law by which the state helps finance the cost of building construction, with local funds being raised by the individual school districts, the State Department of Public Instruction has been able to make major contributions to the progressive development of school construction.

For any real accomplishments in school architec-

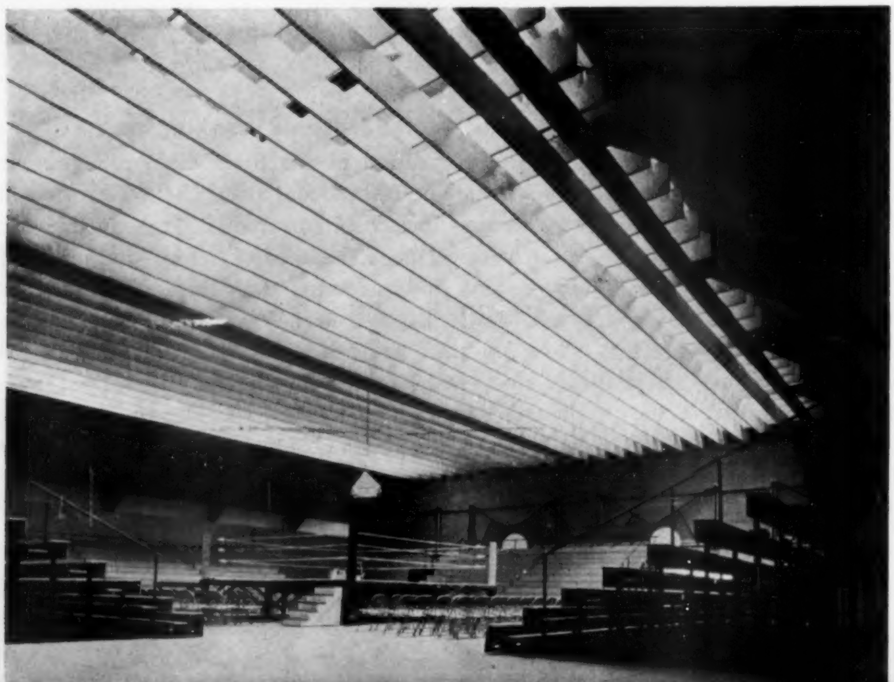
May Valley Elementary School in Coalfield, Washington, has units of four classrooms each, connected by covered walks. The administration and library building is the center unit and the multipurpose building is at the lower bus loading level. The classrooms have fiberglas plastic skylights with louver control for high level daylighting and automatic control of the artificial lighting. The school was designed for the Issaquah School District No. 411 by architect Ralph H. Burkhard of Seattle.

ture many conditions have to be right, permitting the exploring, creative architect and the seeking educator to move forward in their joint efforts. State financial assistance, with a minimum of detailed control and a maximum of working cooperation with local school districts, has created an unusually fertile opportunity for progress. The State Department of Public Instruction has clearly realized the need for everyone—themselves, the educators, the directors, the architects and the general public—to become better and better informed on all aspects of the problem.

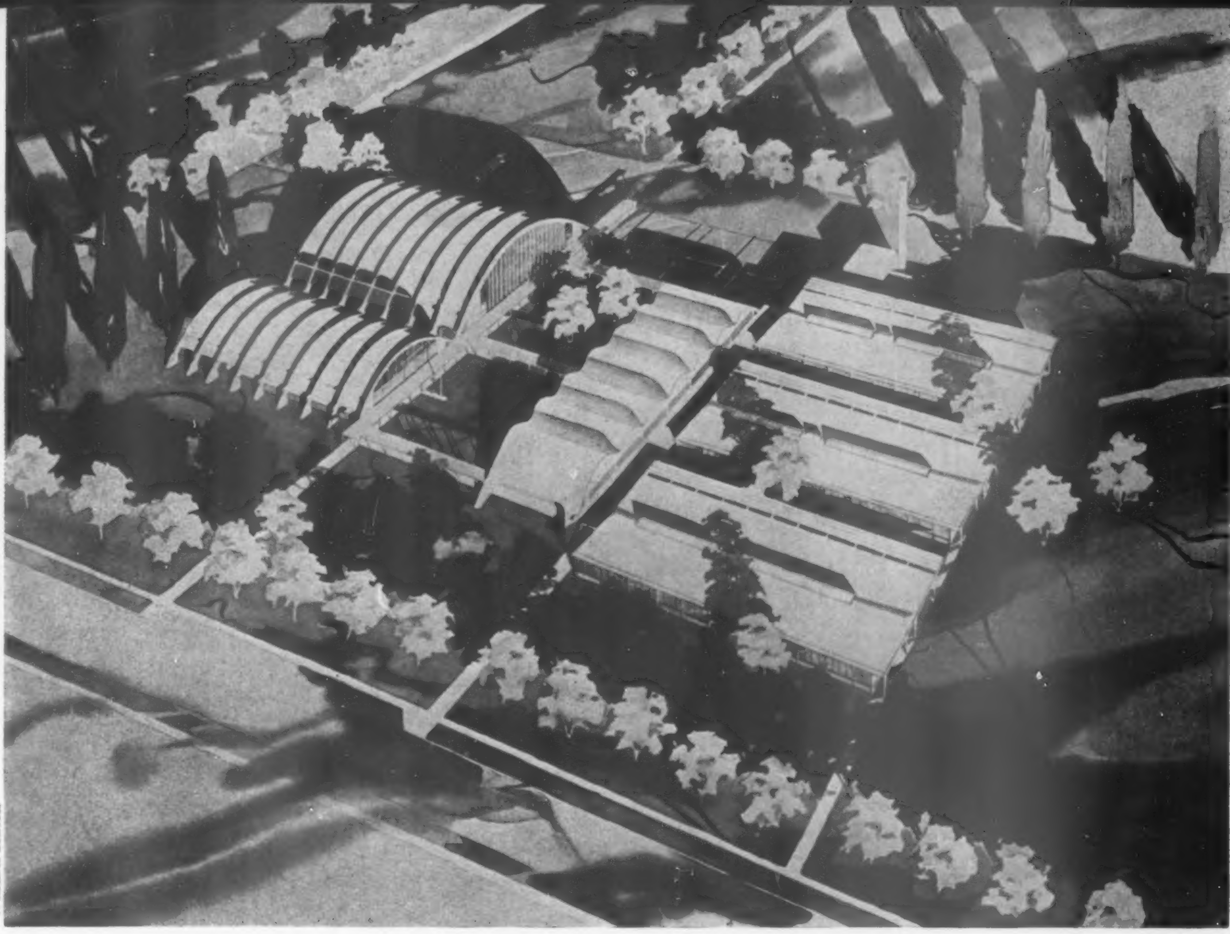
Each year a number of conferences at all levels are held throughout the State of Washington; to these top professionals are invited. Everyone present is drawn into the activities. Another characteristic which has helped forward progress is the availability of any educational official—from state superintendent Mrs. Pearl Wanamaker down—for discussion whenever necessary. Anyone with a problem can readily find an informed educational leader to help him. The Inland Empire Conference, the Mountain Conference and the School Plant Workshop are a few of the annual opportunities for educators, architects and directors to exchange and develop ideas.

Public Meetings Are Held

The method of raising local school taxes requires public meetings which are often continued throughout the year on many phases of the educational problem. When a school district needs a new school, the people are brought to realize it and must vote a portion of the money for its construction. It is the local school district which initiates the building program. Very early in this program the district superintendent requests one of the



The gymnasium of Foster Junior-Senior High School, South Central School District No. 406, Seattle, has concealed central incandescent lighting and overhead fiberglas plastic skylights. The large area is spanned with glu-lam arches. The bleachers are movable.



Willard Hatch

The classroom building of the Ellensburg, Washington, High School is constructed of precast flat-arch frames supporting precast concrete channel slabs. There are precast concrete spandrels and masonry end walls. The gym and cafeteria are of thin shell concrete roof arches cast in one typical section monolithically with its supporting ribs or beams. Forms are reused for each successive panel. Classrooms have fluorescent lighting. The architects are John W. Maloney and John H. Whitney, Yakima, Washington.

state educational leaders to evaluate his problem—to check the soundness of the local level planning, site, facilities, etc.

The state leaders, well informed on the overall attitude of the state's educational direction, and with their broad building background and unprejudiced overall thinking, help to evaluate the soundness and feasibility of the project at hand. Through the state's matching formula, the poorer districts get a greater share of help than wealthier districts; certain large cities get no state financial assistance because of their high assessed valuation per child. Until recently this matching has been to the extent of $3.00 of state money for each local dollar. Now, under a new state law, this amount may be increased up to 90 percent of the total cost of construction and architect's fee for

The James Sales Elementary School, Tacoma, Washington, is of brick and concrete construction with open web steel joists. Bilateral lighting is effected by use of a window wall and single loaded corridors. The interior has built-in cabinets, concrete floors and asphalt tile finish. The architects are Lea, Pearson and Richards of Tacoma.

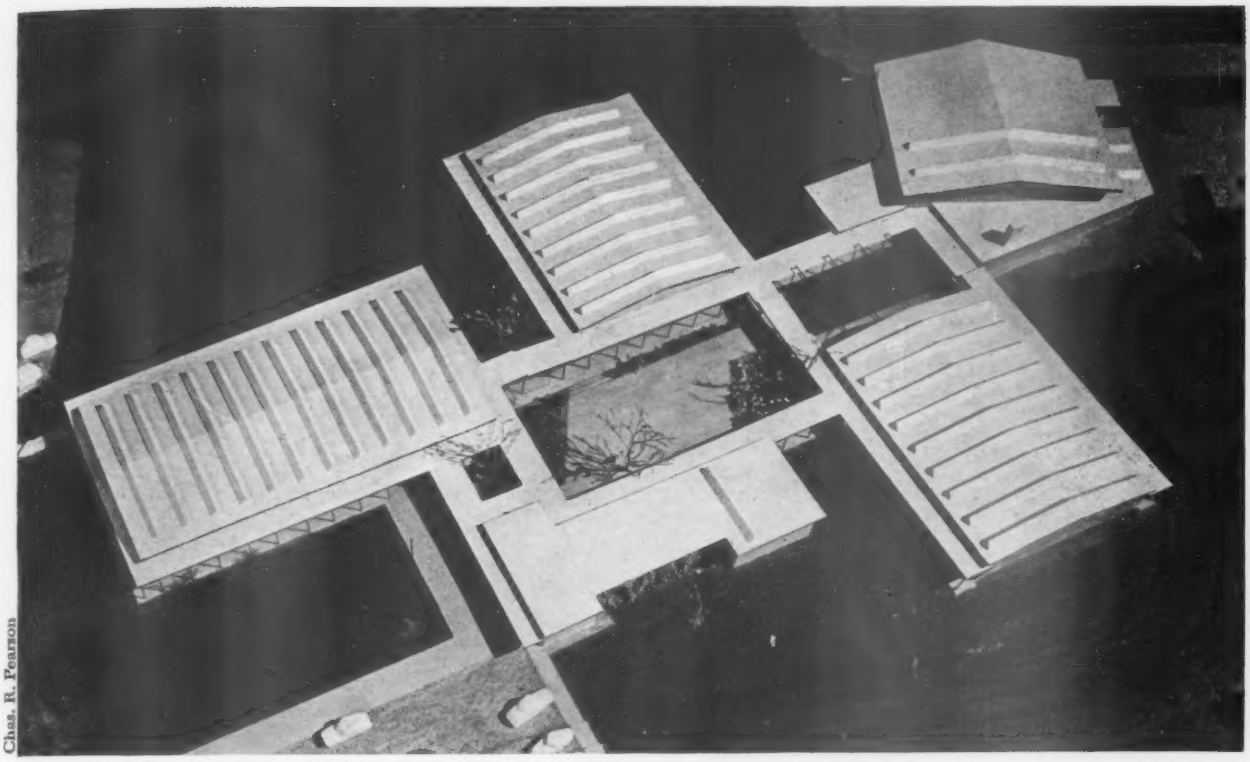
Richards

Carroll C. Calkins

Classrooms in the Clear Lake Elementary School in Bethel, Oregon, are toplighted. Plywood louver panels are operated to darken the rooms when necessary. Low strip windows are at the side. The architects are Wilmsen and Endicott of Eugene, Oregon.

Richards

A gay mural decorates the exterior wall of the kindergarten wing in the Whitman Elementary School, Tacoma, Washington. Lea, Pearson and Richards, architects. Striated plywood was set in concrete forms to mark the pattern, which was then painted.



Chas. R. Pearson

Forest Crest Elementary School, Edmonds, Washington, has 20 classrooms in three units, an administration building and a multi-purpose unit. Classrooms have partial high level, controlled overhead daylighting and automatically controlled artificial lighting. The covered play area has a plastic roof. Covered walks connect the units which have masonry walls and roofs of mill construction. The school, in Edmonds School District No. 15, was designed by Ralph H. Burkhard, architect of Seattle.

areas where new housing growth is taking place at an extremely rapid rate, and where low valuations would make new school construction almost an impossibility.

A state department attitude which has certainly contributed greatly to architectural development is its confidence in the architects. It is believed that the architects, as professional men, have a real interest in the development of better facilities and can take care of the safety of children, the educational requirements and the number of other things which state officials so often attempt to legislate. There is no state code; there is no detailed set of instructions. The state and local educational officials and the architects think and work together. The conferences mentioned are part of this; so, too, are a number of local meetings with the architect at all levels of the building program, involving site, finances, programming, the public, teachers, pupils, etc.

A Challenge to Architects

Among the influx of population has come a number of architects filled with enthusiasm and a desire to make a real contribution to the highly interesting and challenging field of school architecture. The architect's contribution has to be in the realm of ideas, and the older, entrenched firms often are forced to adopt these and go along with the times. Sometimes it seems that the architects talk even more educational philosophy than the educators, but generally it is the teamwork of these two which is shaping progress in the Northwest.

The school directors, usually interested citizens with nothing to gain but the desire to help the education of their children and to see that their money is judiciously handled, play an important part in this work. Since local taxes must be passed by the people before anything can be done, they must be informed of the needs and objectives of the entire educational effort. Gradually, the situation which develops is the participation of many people in a democratic effort to develop education.

One can see the trend away from anything that suggests an "institution" and the developing of another concept. More and more one hears that "the child is the true client." Hence, based on the design principles of the school scaled to the child, of the child growing and learning in a more natural environment, new structures of creative imagination are emerging. As education conferences stress the need for basic recognition of true needs from the child's point of view, some architects are definitely making progress. Meeting places of all types, imaginative atmospheres, developed color schemes, functional use of structure and materials simply and honestly, multi-use of many areas, the flexible classroom, the association of inside and outside,

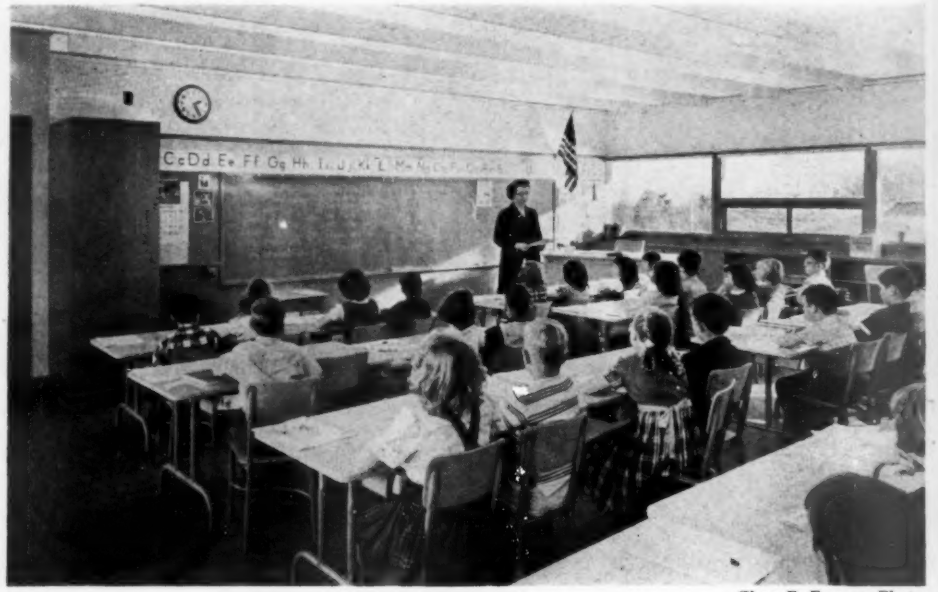
and the general scaling of the structure to the "true client" are some indications of positive progress.

Funds for Construction

In the states of Idaho and Oregon, all school money for construction is raised at the local level with the state education departments acting as advisors. In the State of Washington, part of the money comes from the state and, hence, also some important state control as to what is done. Presently, the State of Washington will match a sum up to $12.60 per square foot, which includes construction, architect's fee of 6 percent and sales tax of 3⅓ percent. Since, above this, the district pays all, every effort is made to stay under this price level. The state approves all sites before purchase by the local district, requiring about ten acres for an elementary school, fifteen acres for a junior high school and twenty acres for a high school.

Most schools can afford to have gymnasiums but not auditoriums since Washington cannot match costs for these. Some few add stages to their gyms, but most educators feel that the stage here is rather poor no

Ceilings in classrooms of the Paramount Park Elementary School, Shoreline School District No. 412, King County, Washington, are vinyl plastic beneath fluorescent lighting. The projecting ribs are for acoustical absorption. The strip windows are for viewing.



Chas. R. Pearson Photos

Paramount Park Elementary School was designed by Young, Richardson, Carleton and Detlie, Architects and Engineers, of Seattle, Washington. The school has covered walks and a covered play area which are ideal for the climate of the Northwest. Construction is steel frame with open web joists painted bright colors. The exterior finish of the building is cement-asbestos-board and brick.

The multi-purpose room of the Southgate Elementary School, South Central School District No. 406, Seattle, has glu-lam arches and a separate public entrance. The classrooms, grouped in four units of three rooms each, have plastic skylights. The plan of the school provides separate play courts. The construction is sprayed concrete on rigid steel frames. Ralph Burkhard, architect.

matter how planned, since it interferes with the function of the gymnasium.

Out of this economic situation the cafetorium has been created to provide a limited assembly space with a small stage and, in general, is used throughout the day and evening for meetings and dances. Some gymnasiums are acoustically treated to permit musical presentations and other public functions but many are not, and so impose built-in limitations. But as the benefits of experience and the cooperation of state advisors, school directors and architects increase even more, problems of this nature will be avoided.

Design Considerations

Since the Northwest region is in the third or most critical earthquake zone, all buildings have to be designed to withstand this force. In some ways this has influenced the design of one story buildings and the structure and materials used.

Generally, design considerations concern the use of open planning with single story construction; open covered corridors; courts which separate and still connect elements of the building and are usually landscaped with local plants for which the Northwest is well known. Many schools are planned as community centers with direct access for civic functions. The development of self contained four, six and eight-classroom units has occurred in the effort to accomplish a suitable child environment. These, connected by covered walks, help give the child the sense of "my school."

Many types of structure are employed: reinforced block, reinforced concrete, prestressed and post-stressed concrete, tilt-up thin deformed slab roofs, lift slab, steel frame with filler panes, glu-lam arches and beams and stud frames. These all have the necessary requirements of strength, ability to take abuse and permanence.

A widespread interest in daylighting is evident with double unilateral and bilateral lighting being used. The value of daylighted central corridors with borrowed skylight is also being recognized. The author feels that this has been caused by the development of

This is a typical classroom with all-directional, controlled high level daylighting, in the Foster Junior-Senior High School, Seattle. The room has a fiberglas plastic ceiling, movable panel walls, movable recessed cabinets and sink units and movable chalkboards. These movable facilities insure complete flexibility for the high school, designed by Ralph H. Burkhard.

fiberglas laminated plastics, although some glass skylights still are specified. The skylighted, rather than the sidelighted, gymnasium seems a natural answer since basketball has so often required the eliminating of disturbing side light.

Louver Controls

In all schools designed by the author, skylighted classrooms with plastic ceilings have louver controls to permit darkouts and control of daylight, and have resulted in complete flexibility of classroom arrangement and student seating. This type of lighting seldom requires artificial lighting, but for those times when it does we have developed a photoelectric unit to turn lights on and off automatically when the light level is 50 to 70 foot-candles at desk height. To cut the electric bill in half is not much of a trick with this arrangement. With diffused daylight, up to 400 foot-candles can be sustained comfortably at desk height. Any disturbing lighting through windows can be eliminated by draw drapes. Another by-product of the skylight is the use of solar heat gain, which has reduced heating bills considerably.

Materials and Maintenance

Materials and the maintenance of school buildings are of real interest since local districts have to pay their own maintenance bills. Painting is one of the costs which architects are reducing by using materials with natural finishes, reserving paint for color on smaller elements. Many items come factory-finished; others require only cleaning. Asbestos vinyl is beginning to replace asphalt tile over concrete with an economy in maintenance and the amount of wax used. Plain and colored concrete is used in some cases, but is not popular. Most gym floors are hard maple, finished with gym-seal, and require a large canvas for other than physical education and basketball use. Swimming ac-

Units of the North Thurston High School, North Thurston School District No. 3, Lacey, Washington, follow the natural contours of the site. Building at right is the shop unit. The school was designed by William Arild Johnson and Associates of Everett, Washington.

Chas. R. Pearson

Play area of the Paramount Park Elementary School, King County, Washington, is covered as a concession to the rigors of the Northwest climate. Architects of the building are Young, Richardson, Carleton and Detlie of Seattle.

tivities are rather undeveloped; a strange thing for an area so rich in lakes and salt water opportunities.

Wall Surface Materials

Wall surfaces have changed from painted plaster to substitute materials, such as cement asbestos board on plaster board, tough vinyl wall papers over taped plaster board, concrete and concrete blocks, some plywood and pressed fiberboard and, in some unfortunate instances, painted plaster board. Many materials are often finished naturally; hence require washing and waxing rather than repainting. Metal doors are coming into the picture to replace wood, but more time is needed to evaluate the durability of metal door frames which clearly seem to have a place and are being used much more.

Exterior walls are concrete, concrete block, cement asbestos board—flat and corrugated, brick or laminated

Richards

Exterior finish of the James Sales Elementary School, Franklin Pierce School District No. 402, is brick and concrete. Architects Lea, Pearson and Richards of Tacoma designed the school.

insulated panels faced with cement asbestos board. The window walls are of steel and aluminum with some woods being stained or painted. Exterior walls may be painted or finished with clear water repellents. Ceilings are often prefinished acoustical tile cemented to plaster board; some are excelsior and cement panels which have good fire ratings and a more interesting surface. Where skylighting is used, ceilings are of fiberglas–plastic or vinyl, both of which are washed about once a year. Plaster ceilings are not too common, except as a base for acoustical tile.

Roofs and Other Items

Built-up roofs of rag felt, while still used extensively, are being replaced with asbestos and glass cloth. The bonded roof is also gaining in popularity, and a flat roof is usually designed for a school building. The author has used corrugated cement asbestos board with fiberglas plastic skylights and glass insulation underneath where there are pitched roofs. Skylights are often of fiberglas, wire glass and formed plexiglass, the fiberglas being the principal material used. Classrooms have more flexibility through the use of skylights, but this may be carried too far in some situations.

Storage units for school buildings are all types, built-in, movable and combinations. Combination tackboard-chalkboards may be movable panels to permit reversal from one to another as needed. Sink units may also be movable. The Foster High School in Seattle has movable, 100 percent salvageable partitions, movable sinks and movable doors, should classroom sizes need to be changed. The author has seen cases, though, where too much mobility has become a disadvantage, resulting in an appearance of chaos, and in a lack of efficiency. Good architectural design and the understanding of its proper use by educators will continue to create better school environments for teaching and learning.

The opportunity of communities in the Northwest to build attractive and functional schools will result directly from the cooperation among state advisors, local school officials and architects. Taking advantage of this opportunity means extending this cooperation and increasing the determination to seek new solutions to the problems of school construction still prevailing. In this way school architecture of the Northwest will continue to develop and become truly the pride of its children.

The instructional materials center of the San Diego, California, City Schools is a well arranged area with enough open space to allow the easy movement of teachers, students, clerks and materials.

INSTRUCTIONAL MATERIALS CENTERS—THEIR PLAN AND FUNCTION

by AMO DE BERNARDIS

Assistant Superintendent, Portland, Oregon, Public Schools

Amo De Bernardis holds B.S. and M.S. degrees from Oregon State College and a D.Ed. degree from the University of Oregon. He has held the position of teacher, supervisor and director in the Portland Public Schools. Dr. De Bernardis has pioneered in the movement to bring together the various instructional material services into a unified center. He has written extensively in the fields of audio-visual aids and community resources.

"SORRY, Miss Brown, we don't have a typewriter to spare for your English class." "I would like to lend you a microscope, but I need them all for my science classes." "I don't know where there is a spare map of South America." "Where could our class go to see a poultry farm?" "I need a good film on our Constitution." "Does anyone know where I can get some good material on the history of our county?"

These problems are typical of many which occur every day to teachers, and they are not always solved as they should be. Why are teachers asking such questions? Because they know that the single text and its resulting memorizer-type learning do not constitute enough material or a satisfactory method for developing children into the kinds of people who will know how to cope with life in our complex world. Teachers realize that if students are to learn how to solve the problems of their adult life they must first develop a background of knowledge, attitudes and skills which will help them to solve practical problems in their school work.

Books are always important tools of learning and we must never neglect them as such, but there are many other and perhaps more direct means for communication which can supplement book learning and make it seem real. Radio, television, motion pictures,

people, daily newspapers, phonograph records and the community itself are some of the resources now available to the teacher. They have the power to transform a classroom from a memory school to a living world.

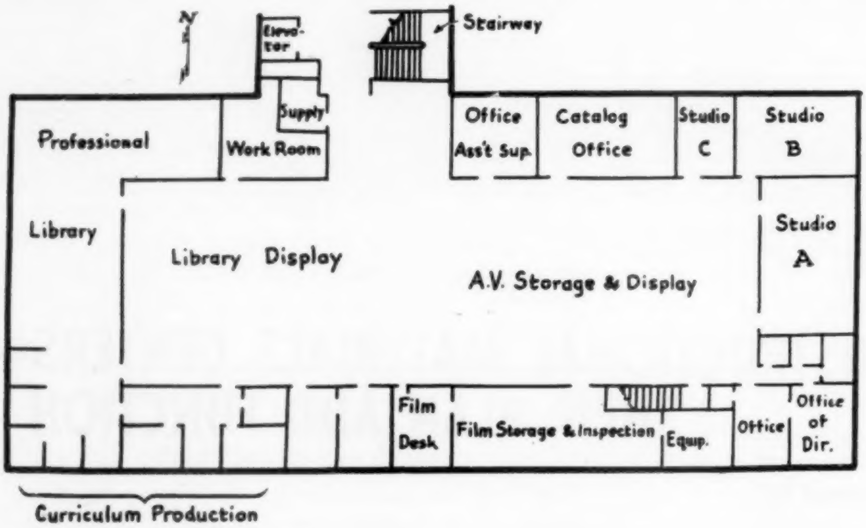
New Concept Presents New Problems

This concept of instructional tools represents a problem for those who are planning new buildings or remodeling old ones. How can we best provide the facilities and resources to make it possible for teachers to get equipment and material when needed?

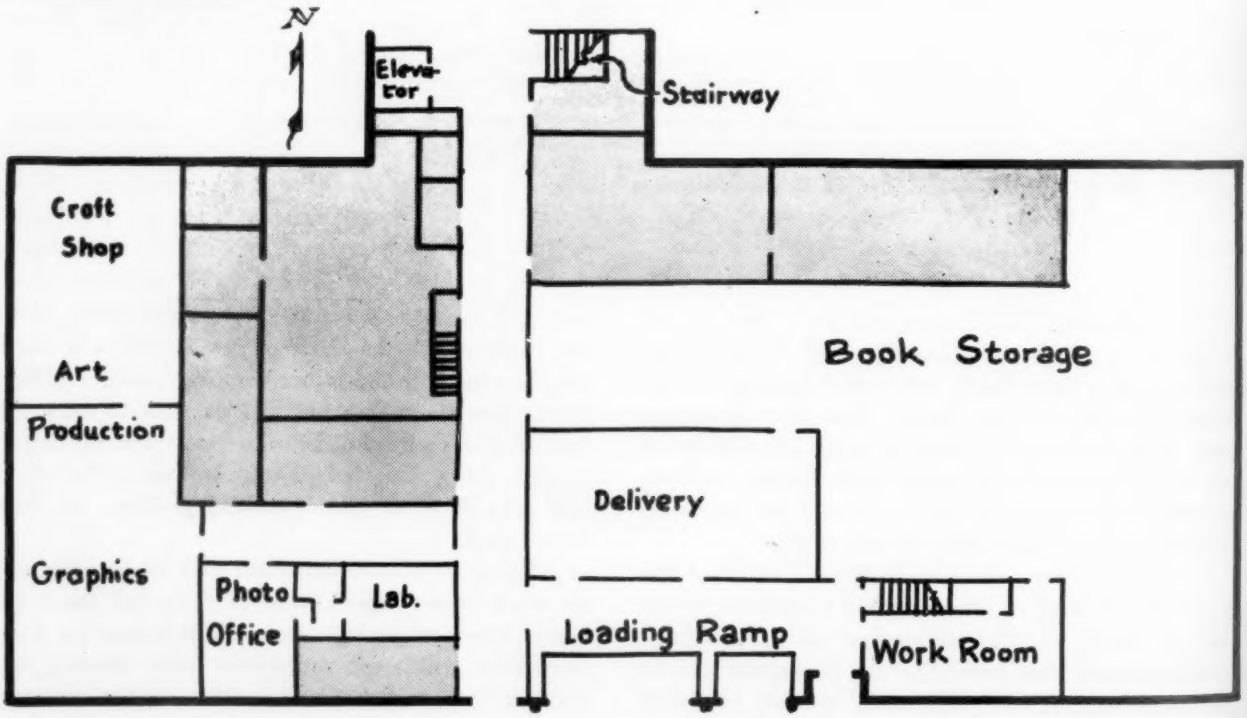
In the past the services of the library, audio-visual materials, radio and textbooks grew independently of each other. Therefore, there has been a tendency, even in new construction, to plan these services as separate departments both within a school system and in the individual schools. The result has been to perpetuate a type of organization which is no longer the most effective.

Why an Instructional Materials Center?

From an examination of the modern curriculum it is evident that teachers today need access to a wide variety of teaching resources and equipment if their work is to be effective. It is up to the administration to help them satisfy this requirement. Just as the modern shopping center has made it easier for the shopper to buy the things he needs without waste of time and energy, so should the school system make it easier for the teacher to get the needed teaching tools by bringing together the various material services, resources and equipment into one center.



The first floor (below) of the San Diego instructional materials center consists of delivery and loading spaces, book storage, a workroom, a photo office and laboratory and production and shop rooms. The second floor (left) has a large central area for library display and audio-visual display and storage. The area is surrounded by smaller rooms for offices and studios. There is also a large professional library on this floor.



Portland, Oregon, Public Schools

Films may be stored on special shelves within easy reach of users. Each film container should be plainly marked with the title.

We can thus provide an educational materials "shopping center," which will not only make it easier for teachers to get materials, but will also help the administrator to do more efficient purchasing, cataloging, inventorying, repairing and distributing.

The center can also continue the "shopping center" comparison by displaying materials attractively. Teachers will be encouraged to use them just as displays of groceries and hardware entice the prospective purchaser. The increased usage will mean that better service is given by the existing professional and clerical staff.

What a Center Can Do

Specifically, what can such a center accomplish for the educational system in a large city system or even in an individual school? The center can:

1. Encourage teachers and pupils to use a wide variety of teaching materials, resources and equipment.
2. Provide a means for the exchange of teaching materials.
3. Provide an effective way to store and distribute educational resources.
4. Provide in-service education for the professional staff.
5. Produce materials not available commercially.
6. Provide an adequate inventory catalog of the material resources and equipment available in the district or school.
7. Maintain teaching tools in a good state of repair.
8. Provide an easy and effective means for drawing together related material on any given topic.
9. Provide a one-stop center where teachers and administrators can find needed teaching tools.
10. Avoid unnecessary duplication and overlapping of materials and services.

Who Plans the Center?

Because such a center cuts across all areas of the school system, combining the formerly separate departments of audio-visual, textbook, library and curriculum laboratories, it should be obvious that group planning is essential in setting up and operating an instructional materials center. Therefore, all the people concerned should be consulted and their ideas and suggestions considered.

Compromise will be the rule rather than the exception. As the center is an integral part of any program of instruction, it seems logical that the person responsible for the curriculum should provide the leadership in planning the center.

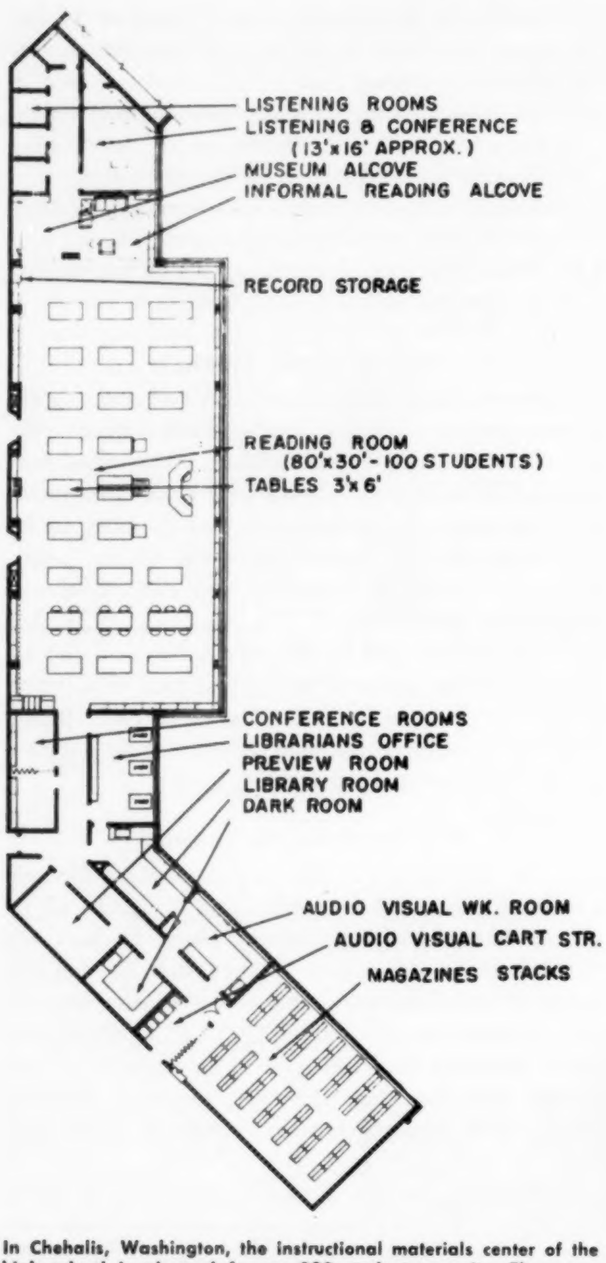
Basic Functions to Consider

The guiding philosophy behind planning the center should be to bring together into one place all resource materials and equipment which teachers and pupils need to carry on the teaching and learning program. It would be impossible to set forth a plan for such a project which would apply to all situations. The ideas presented here will have to be modified in light of the local situation. However, the basic elements would apply to any school or system, no matter how large or small.

The large school system may have more space,

Publishers' samples may be examined at the materials center before use in the classroom.

D. Haimbach, Corpus Christi, Texas, Schools



In Chehalis, Washington, the instructional materials center of the high school is planned for an 800 student capacity. There are private listening rooms, a main reading room, conference rooms and an audio-visual workroom, cart storage area, a preview room, dark room, museum alcove and a stack room for magazines.

more materials and more of a staff than a smaller one. Nevertheless, the objective is the same—efficient service to students and teachers in the use of every type of instructional aid. In general, the following are basic considerations in planning a center.

Housing materials: How the materials are stored will usually determine how they are used. If they are behind locked doors and give the impression of exclusiveness, then only the brave will venture forth to use them. All materials should be housed so that the potential user can quickly get an overview of what is available.

In planning the center for a school or small system, books, films, filmstrips, recordings and exhibits may be placed in the same general area. However, if the number to be served is very large, housing should be arranged by type of material, i.e., audio (records, tapes, transcriptions), visual (slides, filmstrips, motion pictures, stereographs), printed materials (library books, professional books, periodicals, pamphlets, clippings, textbooks), exhibits, specimens, models, maps and globes, graphic and picture materials. Shelving cases, cabinets and the like, should be planned to hold particular types of material to the best advantage.

Here again, the shopping center has some suggestions to offer. Make the displays inviting and interesting. It is difficult to get people interested in material which they cannot see or handle. Another consideration should be space. Provide enough room for teachers and clerks to move about freely without feeling restricted. Shelving should not be so low or so high that it is difficult to reach or use. Lighting, color, acoustics and ventilation are as important in the center as they are in the classroom.

Equipment and Display Space

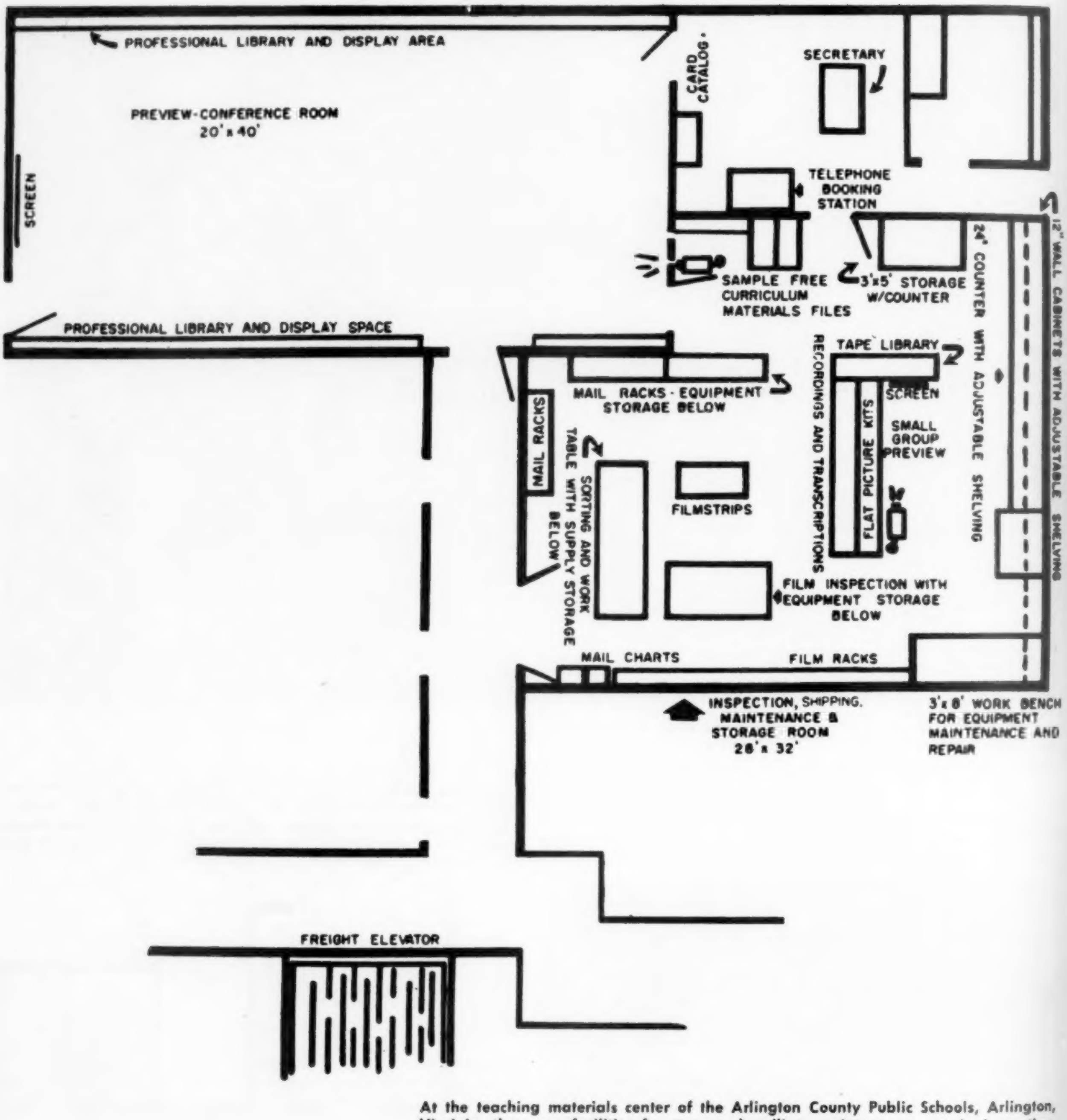
Housing equipment: Many kinds and variety of equipment are used in our schools. Adequate areas should be planned to hold motion picture projectors, recorders, filmstrip projectors, record players and the like. Shelving should be planned to reduce the wear and tear on this heavy equipment. Provision should also be

In the Corpus Christi, Texas, Public Schools, the materials center keeps 484 sound films and 827 filmstrips in tiptop condition despite constant use of the material by the individual schools.

D. Haimbach

The spacious workroom in the instructional materials center of the San Diego, California, Public Schools contains a variety of machinery and tools to serve the needs of the center.

The basic functions of the St. Louis, Missouri, audio-visual instructional materials center for the public schools include storage, handling, repair, distribution and care of materials and equipment, the production of materials, preview and auditioning and administrative responsibilities of the center.



At the teaching materials center of the Arlington County Public Schools, Arlington, Virginia, there are facilities for storage, handling, maintenance, repair, inspection, distribution, preview and local production of materials.

made to house such items as spare typewriters, microscopes, spotlights, maps and globes.

This does not imply that the science department will not have its own microscopes or the typing room its own typewriters. But the center should provide such equipment on a loan basis for the language, social studies or any other teacher who may occasionally need it for special purposes and for short periods of time. Make sure that the space where these devices are kept has adequate storage facilities as well as electrical outlets, inspection tables and hauling carts.

Display and exhibit space: Teachers can gain much information from attractive displays and exhibits. Some of the most valuable are those which show the result of the work carried on in the classroom. Models, dioramas, projects, scrapbooks, paintings, collections, resource units and many others too numerous to mention should be displayed. The value teachers and pupils gain from them is well worth the cost of providing proper facilities for such displays.

If a separate space can be planned for this purpose, the center should include tackboards, exhibit cases and space for table displays. This area can also be planned as a general conference room with display

Portland, Oregon, Public Schools

A professional library is a valuable asset for a school system. When well arranged and lighted it is conducive to research, study and general reading by members of the staff.

The latest books, pamphlets and magazines will be stored in the professional library for use by the teachers of the school district.

D. Haimbach, Corpus Christi, Texas, Schools

space around its four walls. Displays and exhibits in an instructional materials center should not be of the static type. Examples of what is being done by the students and teachers should be constantly changing, so that teachers will look forward to visiting the center to get new ideas or suggestions.

The Catalog File

Cataloging: Publishing adequate catalogs of material, resources and equipment is one of the most important functions of the center. The catalog file will not need much space; however, the location is of prime importance. The catalog file should be centrally located and comprehensive in nature. Not only should it catalog the books, films, maps, globes; but it should be an inventory of all instructional aids available in the school or school system.

Field trips, resource people, microscopes, animal incubators, aquaria, curriculum guides—all should be listed. In this way the center can be of assistance to any teacher no matter what his need may be. The catalog is the source of reference for all information on teaching materials in a particular school located anywhere in the whole school system.

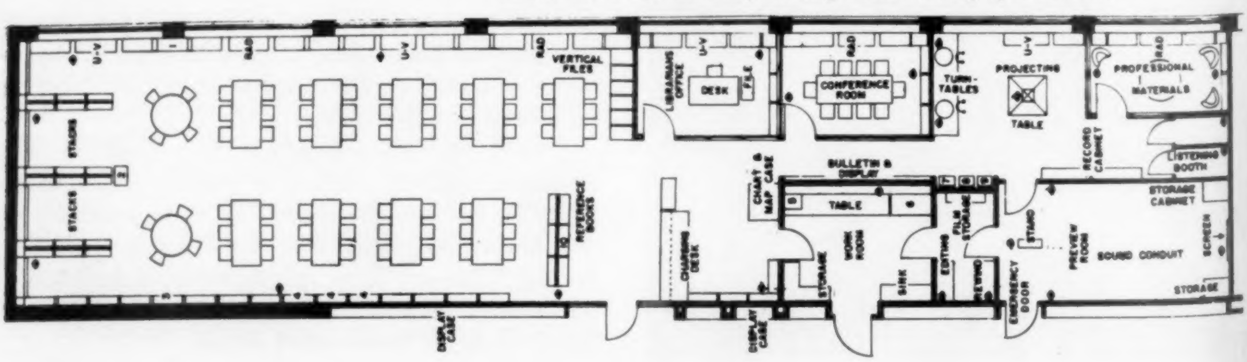
Portland, Oregon, Schools

It is important to have space for the display of curriculum materials, projects and exhibits. This will create a good environment for conferences, study and discussion.

Corpus Christi Caller-Times

Classrooms may borrow collections of prints and art objects from the materials center as supplementary material for particular studies.

The suggested plan for the library in a junior-senior high school with an enrollment of approximately 500 students includes a professional library, preview room, conference room, workroom, listening booth and a projection room.



Preview listening room: No one would think of building a room to house books without providing space for the user to examine the books, read or do research. The same applies to newer type materials such as films and recordings. A preview room large enough to seat at least 30 people should be provided for listening and viewing. This room can also serve as a general conference room when not in use for other purposes.

Small rooms for individual teachers to use in previewing films or listening to records may be included. Provision for a speaker, screen and table should be planned. The number of these rooms will be determined by the size of the system. Proper acoustics and ventilation are a prime consideration for the architect or builder. In the past, ventilation has been a real problem.

Production facilities: Many materials which teachers need are not available commercially. Slides on the local water system or local transportation, or a book about "our city" for third grade use seldom are to be had through usual channels of purchase. These can be produced by the center if production facilities are included in the planning. This requires nothing more than a set space with a worktable, some hand tools, paper cutter, duplicating equipment, sink and storage space for supplies.

If the school system is large enough to warrant it, the production area should include a photo lab, power shop equipment, space for graphic arts and storage space for supplies. This area would be staffed by technicians who do most of the production work. However, it should also be available to teachers so that they can come for help on productions on which they are working.

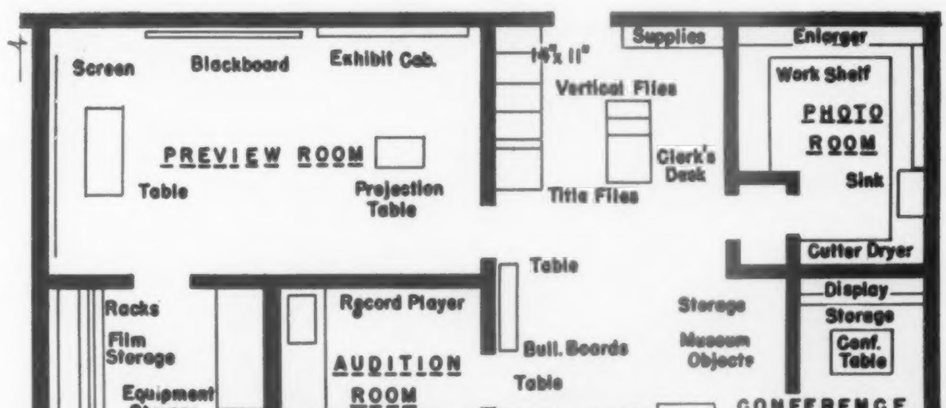
Radio programs can be produced for in-school

School personnel have at their disposal a soundproof room and recording equipment in the materials center of the Corpus Christi, Texas, Public Schools.

listening and public relations. And since, in the near future, television will no doubt be an important factor in the educational program, some thought should be given to providing space where telecasting as well as broadcasting can originate for release through the school or commercial station. In a large school system such facilities should be rather extensive and plans might well include control booths, studio space and properties storage.

Repairs and Maintenance

Repair and maintenance space: If teachers are to use materials and equipment consistently, these must be kept in a good state of repair. Books need to be mended, pictures mounted, films repaired, slides rebound, projectors cleaned, maps repaired and tubes re-



This is a suggested layout for a city-wide audio-visual materials center. Six main areas accommodate a variety of necessary service functions.

(All floor plans are presented courtesy of the NEA Department of Audio-Visual Instruction, and appear in that department's Bulletin No. 3, Planning Schools for the Use of Audio-Visual Materials.)

placed. These are but a few of the maintenance services which must be performed in the materials center. Therefore, the repair area should be of sufficient size to handle the volume of equipment and materials serviced by the center.

Repair benches, parts cabinets, electrical outlets, storage for stand-by equipment, checking instruments, etc., will be needed. If the center is a large one, it might be desirable to separate the servicing of mechanical equipment from that of books, pictures, slides and similar materials. However, unless it is a very large operation, the maintenance area can well be planned as an integral unit.

Distributing the Material

Distribution: Even in a small center the quantity of material moving in and out of the center amounts to a sizable figure. The ease and efficiency with which materials are distributed and received will, in a large measure, depend on how the space is planned. Careful thought should be given to locating the area near a suitable outlet for trucks, mail delivery and teachers' automobiles.

If the center is on the ground floor, this presents no problem. However, if it is on one of the upper floors, then additional service should be planned. Shelving or boxes for incoming and outgoing materials are needed. Areas must permit easy passage of hand trucks and the handling of large pieces of equipment and boxes of materials.

Office space: It goes without saying that the staff at the center will need sufficient office space to carry on its work. In a small center an office for the director and space for the clerical staff will be sufficient. However, in the larger center office space must also be provided for the assistants, catalogers and consultants.

In either case it is imperative that all staff members be housed as an integral part of the center. This not only means more efficient working relations, but helps to build the team spirit which is so essential to successful operation. Communication between those in a large center should be provided by telephone or an intercommunication system.

Lobby: How the entrance is planned will to some degree determine how people react to the center. The lobby need not be spacious, but it should be inviting. Its display, bulletin boards and general arrangement should be planned to give teachers the impression that they are saying, "Come in. Here is where you can find materials and resources to help you in your teaching."

Colorful maps are among the teaching aids which may be personally examined at the Corpus Christi center prior to use in classrooms.

D. Haimbach

A workshop is an important part of the center. It makes it possible to produce materials, models and other items not available through commercial resources. This workshop is part of the San Diego materials center for the city schools.

San Diego City Schools

If necessary, special cabinets and shelving can be designed and built to specifications to house the many varieties of material found in the central instructional materia's unit of the school system. All materials and shelving for mounted pictures and models should be arranged so that teachers can easily locate needed resources.

A book alcove, like this one in the Department of Instructional Materials, Portland, Oregon, Public Schools, will assist teachers and staff members to locate needed printed materials quickly and efficiently.

The materials center for the San Diego City Schools can handle a constant flow of teachers, students and clerks without unnecessary crowding and delays.

Staff: No center can possibly operate without an adequate staff. Not only must it be adequate in number but it must have the philosophy of service to teachers and children. How large a staff the center needs will usually depend upon the size of the school system. Be it large or small, it should be well trained. The usual practice of designating any person who has extra time on his hands to handle the services of an instructional materials center will not produce satisfactory results. It may even ruin the whole idea.

Choosing the Director

The person who has the responsibility for organizing and directing the services of the center should be one who not only has the necessary technical knowledge but also understands the curriculum and the needs of the classroom teacher. He should be a person who likes to work with materials and with people. An especially important function of the center is the one involving human relations. If the center is a pleasant place to visit and those who work there really like people, the center will fulfill its educational function and be an asset to the school system and community.

As one considers all of its aspects, a materials center may seem complicated and much too expensive for a school or system to plan and operate. However, many schools are already providing some of the services which are included in an integrated center. All that remains is to get people together to work out common objectives and procedures. Many new schools are now being built with separate libraries, audio-visual, photo labs, textbook rooms, workrooms and preview rooms. All that is necessary here is to rearrange some of the space and a very workable center will result.

For those who think the cost is prohibitive, consideration should be given to the fact that schools are hiring professional people at good salaries, but in many instances are not providing them with the kind and quality of tools with which to do their best work. Here we can take a lesson from industry; it finds it profitable to provide the workers with the best tools available in order to create a good product.

The school's product is the future citizen. It is not enough to hire good teachers; we must put into their hands the best tools we can find and do it in the easiest and most efficient manner. The instructional materials center is one way of doing this, perhaps it is the best way.

The George Mason School in Richmond has a postwar addition with glass block window walls. The older sections of the school can be seen.

Arthur Clarke

POSTWAR RENOVATION OF SCHOOLS IN RICHMOND, VIRGINIA

by THOMAS C. LITTLE

Assistant Superintendent, School Board, City of Richmond, Virginia

Before joining the Richmond staff in 1954 Dr. Little was a teacher and administrator in Kentucky school systems. For six years he headed the Education Division at Georgia Teachers College in Statesboro. Dr. Little has an A.B. degree from Eastern Kentucky State Teachers College, an M.A. from the University of Kentucky and a Ph.D. from George Peabody College for Teachers.

and ERNEST R. GILBERT

School Architect, School Board, City of Richmond

A native of Richmond, Mr. Gilbert became the school architect in 1955, after extensive private practice in the design of schools. He had previously been a high school teacher in the city and pursued graduate work in education at the Universities of Richmond and Virginia and the College of William and Mary. Mr. Gilbert is a graduate of the University of Pennsylvania.

AT the close of World War II the Richmond, Virginia, Public School System, like many other school systems throughout the nation, was faced with a tremendous housing problem for its pupils. Many of the existing school buildings were obsolete. Others that met reasonable standards for school housing were badly in need of extensive renovation. The deferred building program had allowed a steadily growing population to overcrowd the existing facilities.

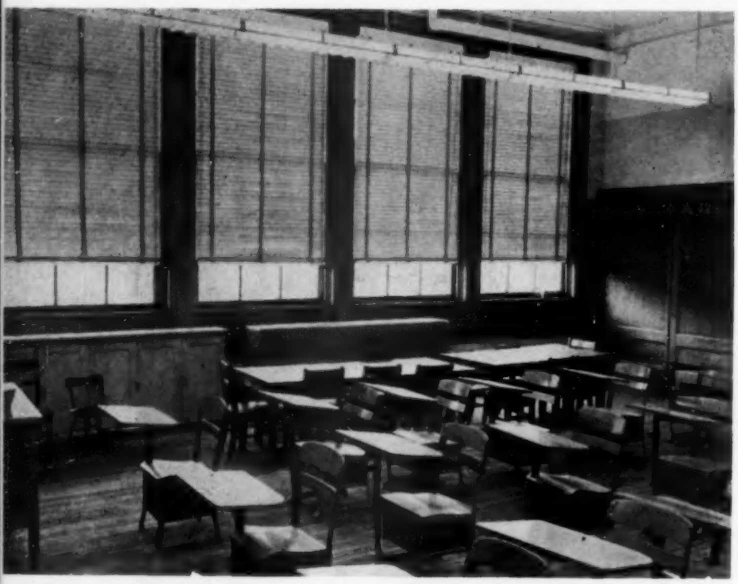
The first step toward remedying the situation involved an analysis and appraisal of existing school facilities to determine which plants were sound enough structurally and functionally to be renovated and renewed; which plants should be abandoned for school use; and which areas of the city should be provided with completely new school facilities.

This analysis and appraisal was an on-going process. In 1946, the newly elected superintendent of schools, Dr. H. I. Willett, reported to the school board an immediate need for four million dollars for deferred maintenance.

In appraising the old school plants, it was decided that those plants which were so obsolete that it was impractical, from an economic or educational standpoint, to renew or renovate them, would be scheduled for abandonment as soon as adequate facilities could be provided. These obsolete buildings were to be maintained at a minimum level until abandonment could take place. At the present time only one such plant is still in use and six plants have been abandoned for school use.

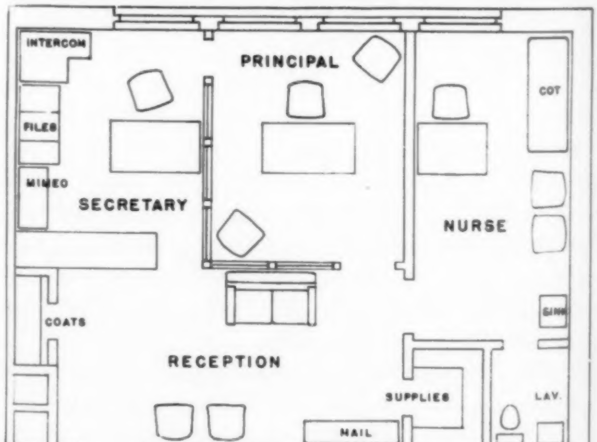
The Main Problems

Buildings that were still usable but which were, for one reason or another, not suitable for expansion were scheduled for renovation. Main problems involved in this renovation centered around (1) repairing and replacing heating and ventilating equipment; (2) provid-



A classroom like this, which adjoins the administrative suite at Buchanan Elementary School, was converted into offices.

Offices for the secretary, nurse and principal were provided for the Buchanan Elementary School from the space formerly occupied by a classroom. The area also includes a reception room, lavatory, supply section and wardrobe space.



ing adequate artificial and natural light; (3) painting and redecorating; (4) renewing of floors; (5) making structural repairs; and (6) utilizing the maximum of existing space.

Standards for all the aforementioned areas were established and most of this renovation was done by the department of buildings and grounds of the school system. Most obvious and pressing needs were considered first. Work was carried out so that there was no interference with the daily operation of the school program.

Although this work program has not yet been completed, all heating and ventilation plants have undergone extensive repairs, and sixteen plants have been provided completely with modern equipment. During the next ten years the remaining old plants will be replaced.

A total of twenty-nine schools has been partially or wholly relighted with improved incandescent or fluorescent light. Work is yet to be done in this area and a program of proposed priorities is in effect. This work is expected to be completed over the next five to eight years, as funds become available.

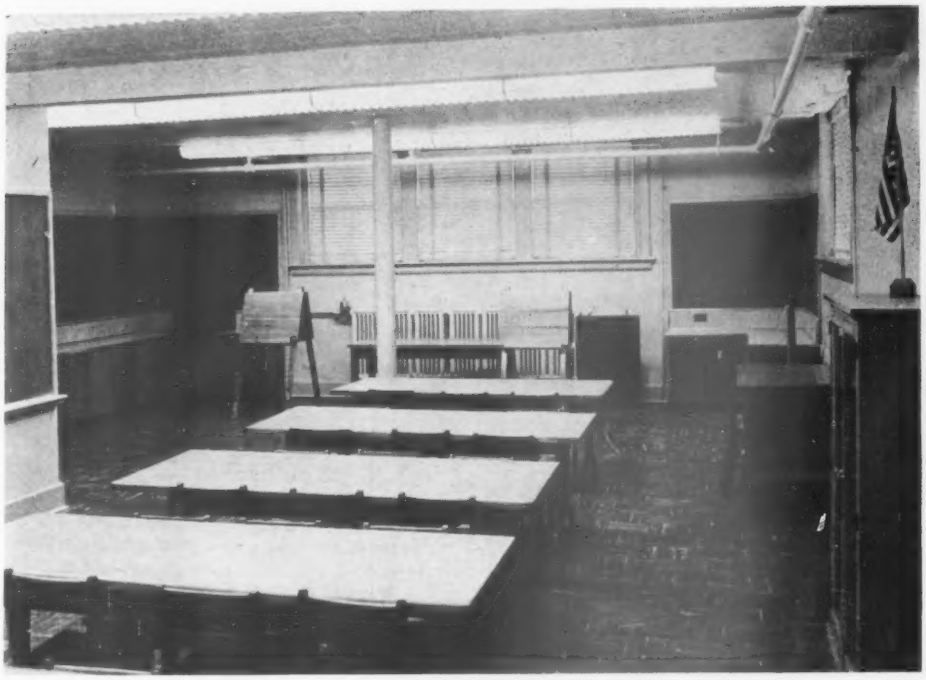
Walls and Windows

All buildings are now on a nine-year-interval paint schedule, with intervening washings. It is hoped that this paint interval can be squeezed to six years as soon as the program of deferred maintenance is a little more in hand.

The task of replacing roller shades with Venetian blinds was started in 1948. All blinds are built by the department of buildings and grounds in the school system's blind shop. The cost of constructing these blinds is now running to approximately 60 percent of quotations from commercial suppliers. A great advantage is realized because the dimensions of the blinds can be standardized. Currently this program is almost 70 percent complete.

Floors in a few of the old buildings have been replaced. However, this remains as one of the biggest items of renovation yet being faced.

A difficult problem connected with the renovation



Once a basement storage room, this classroom at the Summer Hill Elementary School has ample floor space for class activities, work counters and chalkboards around the room.

of old buildings was the maximum utilization of existing space. Many older buildings were constructed with subgrade rooms, not designed as classrooms, that were originally used for storage. Nearly one hundred such rooms have been converted to classroom, art, music and resource room use.

New Service Facilities

Many of the buildings had inadequate space for administrative offices, health clinics, libraries and other service facilities. Former classrooms and miscellaneous space were converted for such use. This conversion of space has allowed the school program to expand into what a modern school program should be. Many toilet and rest rooms areas, that were considered to be substandard, have also been renovated.

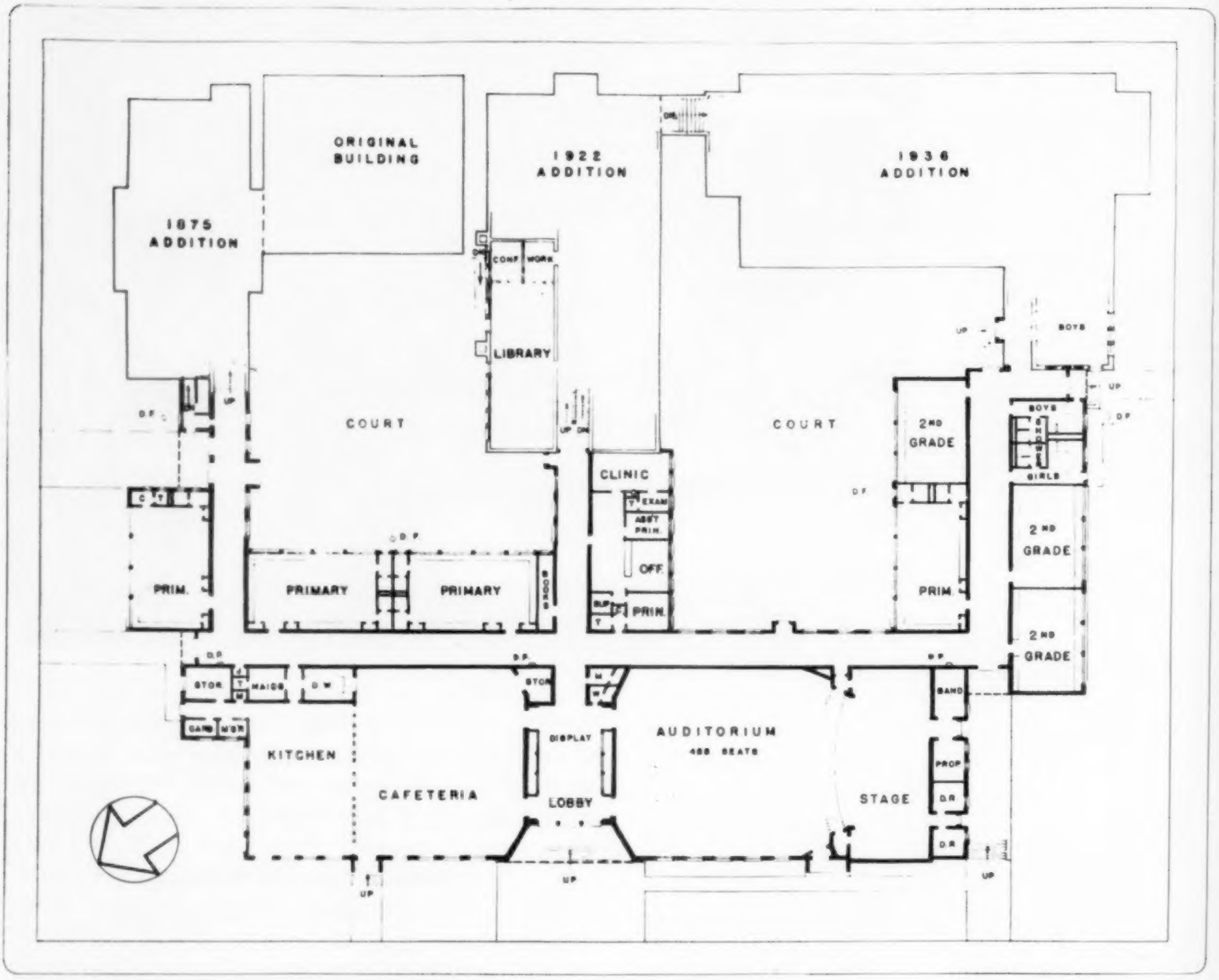
In addition to modernization work carried out by the department of buildings and grounds of the school system, fourteen prewar plants have been renovated and extended at a cost of $6,893,043. This work has been financed by capital funds on a contractual basis.

Additions to Old Buildings

When it was decided to build an addition to an existing plant, a complete job of renovation was done on the old building. Where needed, it was relighted and redecorated. Floors were replaced. Mechanical equipment was renewed. Many areas were redesigned for modern use, and the old structures were generally remodeled to blend with the new additions. The last of such modernizations is now being completed.

For this work six leading firms of Richmond archi-

Another classroom at Summer Hill Elementary School which was converted from basement storage space. This room means that valuable area has been put to good use.



The plot plan of the George Mason School reveals how school property has been developed for maximum use. The original small building of the school was added to in 1875, 1922, 1936 and again in 1953, the latest addition. The courts are used as safe play areas for the smaller children in the primary grades. The main playground of the school is on the other side of the street to the right.

tects were selected and each was given a commission so that the various jobs progressed concurrently. Before starting preliminary sketches the architects attended several meetings with the superintendent and his staff. Standards were agreed upon to insure wise expenditure of funds in the selection of materials, and to take advantage of the experience of school personnel in the maintenance of existing buildings. These standards were printed and supplied to each architect.

No Design Restrictions

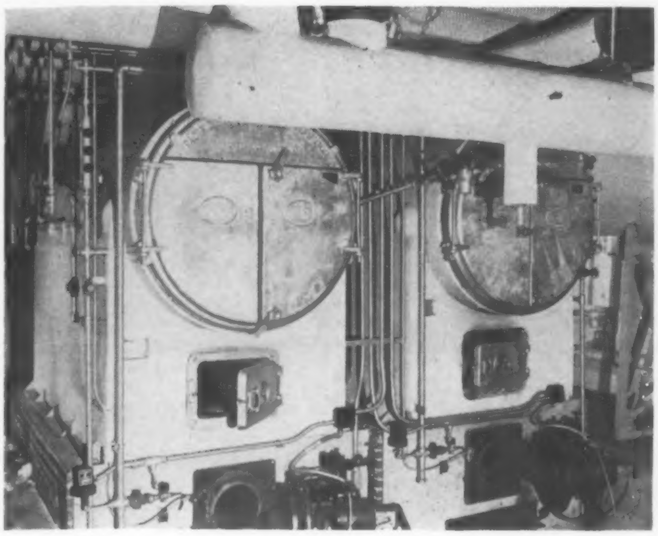
An attempt was made to adhere to reasonable standards of construction costs, but functional adequacy and permanency were always considered of primary importance. No design restrictions were imposed upon the architects. The ingenuity of each designer was encouraged in these alteration projects. At one school an addition was authorized for a group of four existing buildings. The original building was more than a hundred years old and was scheduled for early demolition. The plan of this school shows the maximum use of a normal city block. Additional land was acquired nearby for playground facilities.

Problems in Older Schools

Older school buildings presented the greatest difficulty in planning additions. In many cases the values of land made the cost of expansion prohibitive. In one instance it was necessary to stack the auditorium over the cafeteria and kitchen and to provide a split-level front entrance.

Community Activity Areas

All school buildings in Richmond are designed to serve community activities throughout the year. Certain areas of the buildings, such as auditoriums and multi-purpose rooms, are isolated for special use without giving access to the entire building. This lends itself



A modern oil burning heating plant of the indirect warm air type with automatic temperature control and room thermostats (left) was converted from an old hand fired direct hot air plant (right).

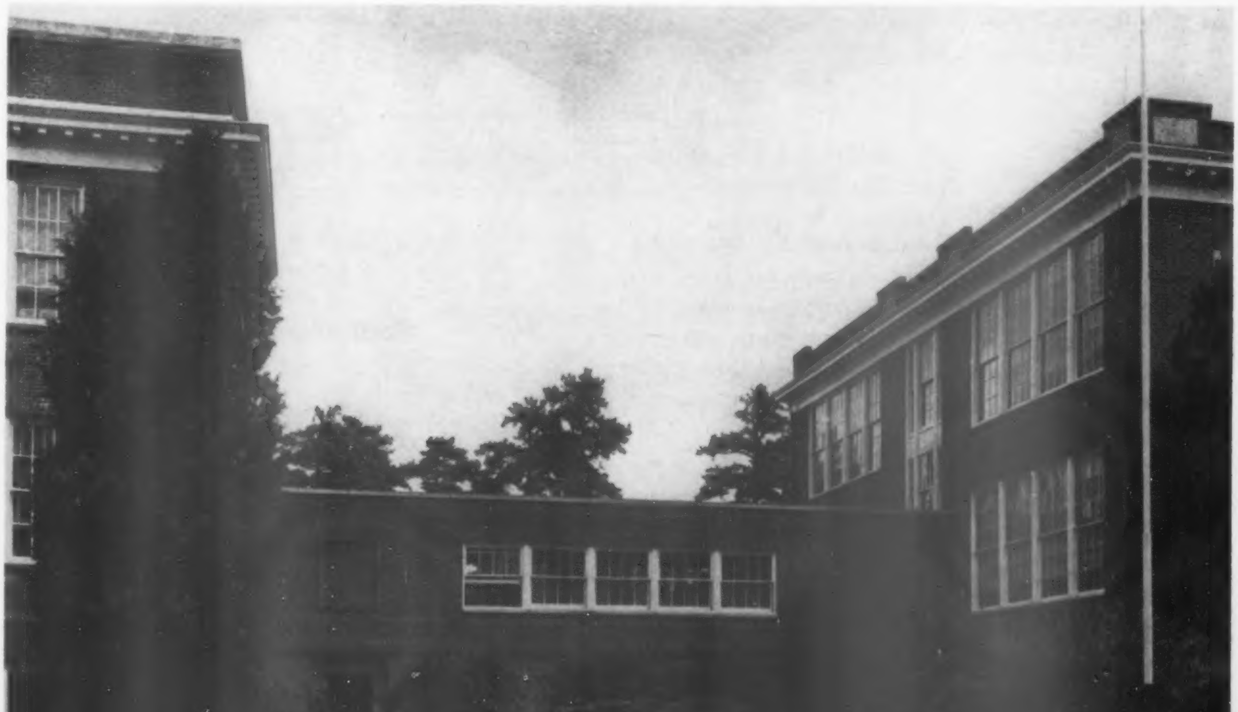
to easy maintenance and supervision. Heating systems are zoned for like reasons. Toilets and showers as well as multi-purpose and play rooms are planned to serve during the summer months. Direct access is provided to recreation areas while other portions of a school building are closed.

The school board of the City of Richmond and the department of recreation and parks work in close cooperation in the planning and use of school facilities. In this way citizens of all ages are able to make use of school facilities every month of the year.

Module System Used

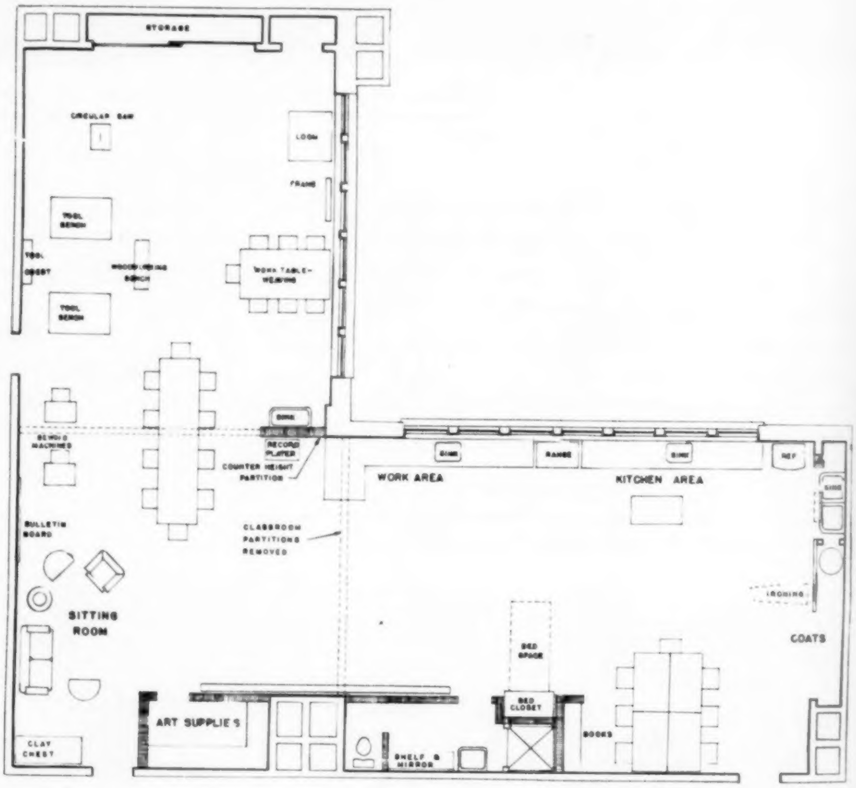
The module system has been followed for many of the new additions and the floors were designed for partition loads at any point. This enables the reduction

A connecting passage has been constructed between the two Westhampton school buildings which were acquired by the city of Richmond.



Arthur Clarke Photos

Four stages in the development of the Summer Hill Elementary School, with the original building at left, the second building in the center and the postwar addition at right.



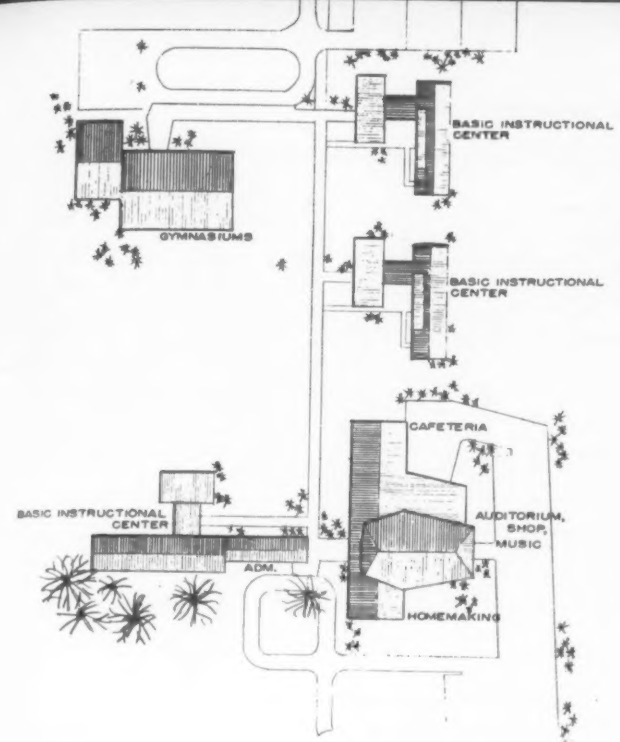
Two classrooms of the Robert Fulton School were joined to an inside dark corner area to form one large L-shaped resource room.

or increase of areas as needed to meet the fluctuating requirements of a modern school program.

Many problems were encountered in building additions. In some instances the third or fourth unit was being added to an original building. No attempt was made to continue any period type of design. Concerted effort was directed toward functional solutions with logical circulation features, and simplicity of design for ease of maintenance. Differences in floor levels among the various units were solved by providing ramps where possible. This eliminated the hazard of steps. Full use was made of new materials and methods of construction. For example, directional glass block has been and still is the subject of exhaustive tests and experiments.

More Demands Arise

Richmond has not yet solved all of its housing problems for its children. An ever increasing pupil population is still pressing for additional space. Some of this demand can be met with new buildings in new locations. However, much of the need is occurring in areas where new school sites are not available. It appears that another round of additions to existing buildings will have to be considered for the near future.



Three basic instructional centers for 250 students each are included in the plan of the Lower Merion Junior High School, Pennsylvania, for a total capacity of 750 students. Specialized facilities are found in the central building, supported by a separate physical education plant. Architects are Harbeson Hough Livingston and Larson; educational consultants are Engelhardt, Engelhardt and Leggett.

SCHOOLS WITHIN SCHOOLS

by STANTON LEGGETT

Engelhardt, Engelhardt and Leggett, Educational Consultants, New York City

Dr. Leggett was a Henry Evans Scholar at Columbia College where he received his A.B. degree, and held the Eleanor C. Morris Fellowship at Teachers College, Columbia University, for his M.A. degree. He also received his Ph.D. degree from Columbia University. Dr. Leggett held teaching and administrative posts in New York and New Jersey and also taught at Syracuse University and the University of Illinois. His work as educational consultant has brought him into close touch with school systems throughout the nation.

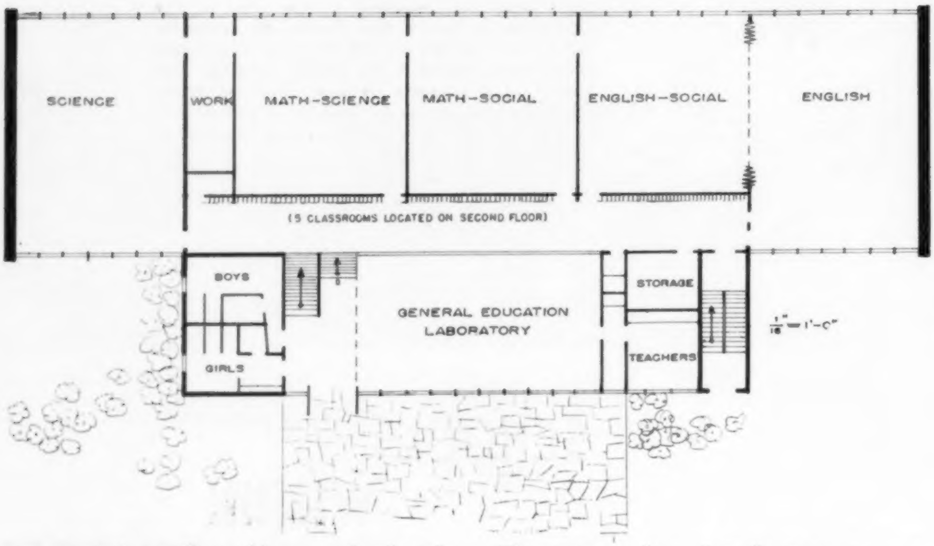
THE boys and girls from our crowded elementary schools are now turning up in increasing numbers as the young men and women of our secondary schools, and the nation's school building crisis moves into its second and, possibly, its depressive phase. An increasing proportion of the school plant funds of our country will be devoted to the construction of new schools for youth. At the same time, there is considerably less assurance that this money will be well spent.

On the elementary school level a pattern, ragged and uneven to be sure, developed for new buildings that contained promise and a sense of direction. Despite all the hullabaloo about contemporary design and gadgets, the important happening was that the size of classrooms in elementary schools had increased.[1] By this event the elementary school teacher was freed to teach, all other things being equal, even if the overhang didn't keep the sun off the desks or the trilaterally lighted room was the death of the educational moving picture program.

There is no such pattern, vigorous and widespread, that stands out with any surety on the secondary school level. A disappointingly large number of the new high school plans seen are indistinguishable from those of the 1920's except that, perhaps, the stadium can seat more spectators, the gymnasium can seat more spectators, the auditorium can seat more spectators, and the coach's office is larger and more remote from the students. True, the outside wrappings are mildly different, but under the skin it's the same old beast.

Portents of change, not for its own sake but as a result of inquiry into the why of doing things, are slight. There is a heartening, but admittedly limited, tendency to see the science laboratory as a place where students

[1] *Spaces and Their Sizes*, Engelhardt, Engelhardt and Leggett, New York 19, New York, 1950.



The Lower Merion, Pennsylvania, Junior High School "little school" for 250 students in a two story campus plan unit provides for ten teacher stations. These all include science, mathematics, social studies and English. The teacher stations are supported by a general education laboratory or work area with its auxiliary facilities. The program emphasizes freeing teacher time for work with small groups or individuals.

come to grips with problems and solve them. This is in contrast to the old method of filling out notebooks by following recipes. Good teachers are calling for more teaching and learning space in classrooms, as social studies, English and mathematics take on a laboratory approach. Some few are getting that desperately needed space. The social activities of a secondary school are being recognized, if they are not legitimized. Guidance activities are on the rise, judging by the increase in space devoted to this function. And, as we finally get to the point, scale is being sought as an educational function of the secondary school plant.

Size and Complexity

It is a serious anomaly that on the secondary school level we seek size in order to finance complexity. Yet, having achieved size and hence complexity, we have frequently created a monster. Anonymity or the cold impersonality of a mass educational institution is a deeply destructive and real thing.

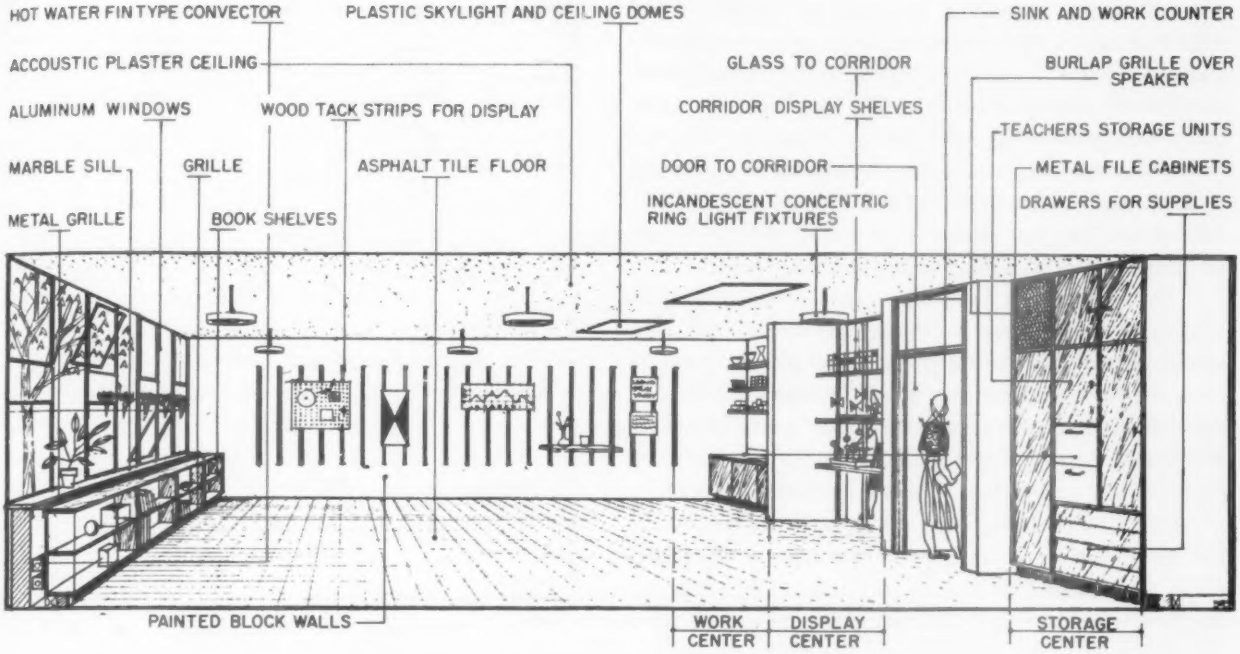
It is also true that the complexity that enables us to differentiate, to train for specialization, to give talent range in which to develop and, generally, to help young people to flower, is based or added on to a fragmentation of common subject areas. There is cause for seeking an intellectual unity or at least an intellectual cross reference among subject matter areas.

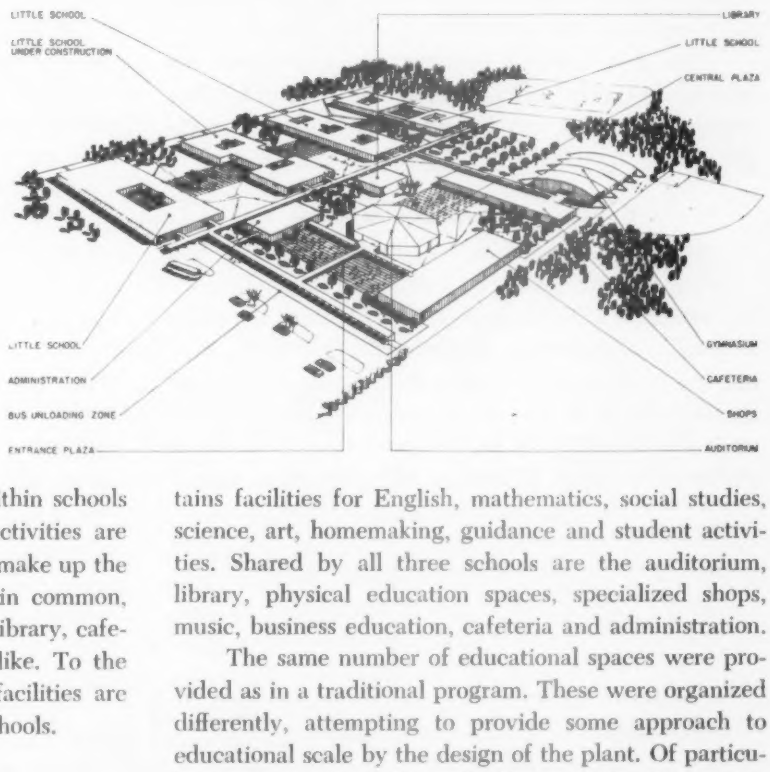
Underlying all this is the great impact strong adult personalities in the school can have upon young people growing into adulthood, if the impact is not insulated by numbers. Guidance, this highly personalized reaction, cannot take place effectively when the recipient is one in a veritable sea of faces.

The concept of a school within a school is not new nor is it very widespread. It has taken on significance since its renascence has occurred at the early stages of a tremendous tide of construction of new secondary school buildings. The concept of a school within a school suggests that, whereas we frequently need a large number of students to support a greater number of specializations whether it be languages, advanced, general, applied, or survey courses in sciences, or vocational electronics, a fair share of the school day can be fashioned so that the student spends his time in a small subgroup with a smaller group of teachers. Thus, the guidance program can work through to the student and the goal of complexity can be achieved with some substantial reduction in the onset of impersonality.

For example, in Riverview Gardens, Missouri, under the leadership of E. M. Lemasters, superintendent of schools; in Charlotte, North Carolina with Dr. Elmer H. Garinger, superintendent; in Columbia, South Carolina, with Guy L. Varn, superintendent; in Mecklenburg County, North Carolina, James W. Wilson, superintendent; and in other areas, secondary schools have been de-

Major facilities to be found in a general education laboratory are outlined below.





Riverview Gardens Senior High School in Riverview Gardens, Missouri, is an 1,800 capacity school now under construction. Architects are Hellmuth, Obata & Kassabaum with W. P. Manske, associate architect. The completed project will consist of four little schools supported by general facilities that serve each unit. A typical laboratory-type classroom for the high school handles social studies, English, mathematics and languages. Each room has a sink, work counter, teacher's storage space, material and book storage and display space.

veloped that provide for smaller schools within schools in which most of the major educational activities are carried on. Some three smaller schools may make up the large unit. All of the little schools share, in common, specialized general spaces like auditorium, library, cafeteria, administration, gymnasium and the like. To the extent that specialized shops and similar facilities are desired, these are shared by all the little schools.

The Riverview Gardens Plan

The Riverview Gardens High School plan serves as an example. In a rapidly growing suburban area of St. Louis, it was determined that a senior high school with an ultimate capacity of 1,800 pupils was the feasible solution to the building problems of the community. As a result of close analysis by the superintendent of schools, the staff and our firm, as educational consultants, it was decided to break the 1,800 pupil school into three subschools of 600 pupils each. Each "little school" contains facilities for English, mathematics, social studies, science, art, homemaking, guidance and student activities. Shared by all three schools are the auditorium, library, physical education spaces, specialized shops, music, business education, cafeteria and administration.

The same number of educational spaces were provided as in a traditional program. These were organized differently, attempting to provide some approach to educational scale by the design of the plant. Of particular interest is the guidance facility providing for a series of counseling rooms in each little school. It is planned to provide a full-time guidance counselor as the leader of each school, with other counseling time made available for teachers. Spaces for interviews, testing, parent-teacher conferences and records have been planned for each little school. An overall administrative space for the entire plant is also provided.

In Charlotte, North Carolina, the new Ashley Park Junior High School represents another similar approach

where two little schools of 450 each are planned, each school providing shop, homemaking, science and art facilities as well as classrooms. The little schools will share the general facilities including library, administration, cafeteria, gymnasium, music and auditorium.

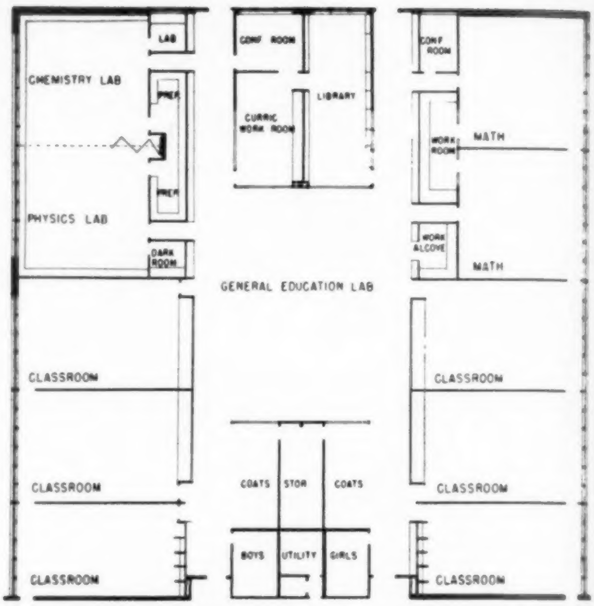
Both of these schools will be organized vertically. That is, each little school in the Charlotte Junior High School will contain grades 7, 8 and 9. In Riverview Gardens, each will serve grades 10, 11 and 12.

By including in each little school various specialized areas, it is hoped to strengthen the relationships among subject matter areas rather than pull them apart, as is the tendency when a school is organized by departmental lines. For example, an art room is an integral part of each little school in both plans. Rather than relating art to the stage as if its major function were to provide space for painting stage sets and to do posters for the PTA, art is included as one of the major areas of the general education program for all students. Its work is related to other fields and its impact may be greater by that organization. Operating as an expressive force in all learning situations, art becomes much more than just an additional service for the school.

The above two illustrations, and the others that are included, graphically illustrate the thesis of battling impersonality while striving for a size that allows complexity.

Concept Fosters Many Ideas

The little school (not so little with 450 or 600 students but, at least, less large) contains within its concept many ideas for exploitation. By creating a series of parallel organizations, opportunities appear for multiplying students' participation in activities. One overall student council for the school can be supplemented by student subcouncils for each of the little schools. Many photography clubs, if there is the interest, as against



This unit of the Syosset, Long Island, High School serves 250 to 300 students in a high school designed for 1,750 students.

one large one may be wise. As a device, intramural sports involving large numbers of students can be organized around the little school and the prestige of participation in intramural activities will be raised. Dramatics, music organizations, school papers and the like can be organized for each of the smaller groups.

The proliferation of activities has an underlying value that penetrates to the heart of the problem of impersonalization. In many large schools a vast percentage of students go through school without ever really coming in contact with the school. These are the students who obviously have no talent for getting high marks in college preparatory courses, for art, music or vocational endeavor, or even for getting into trouble. These are the run-of-the-mill students and when the

The Ashley Park Junior High School, Charlotte, North Carolina, has a capacity for 900 pupils, broken down into two virtually self-contained junior high schools of 450 students. Each school contains classrooms of laboratory-approach size, homemaking, general shop, arts and crafts and science space. Cafeteria, library, administration and physical education space are shared by the two schools. The architect is James A. Malcolm.

school is operated like a mill what else can be expected?

Another Little School Plan

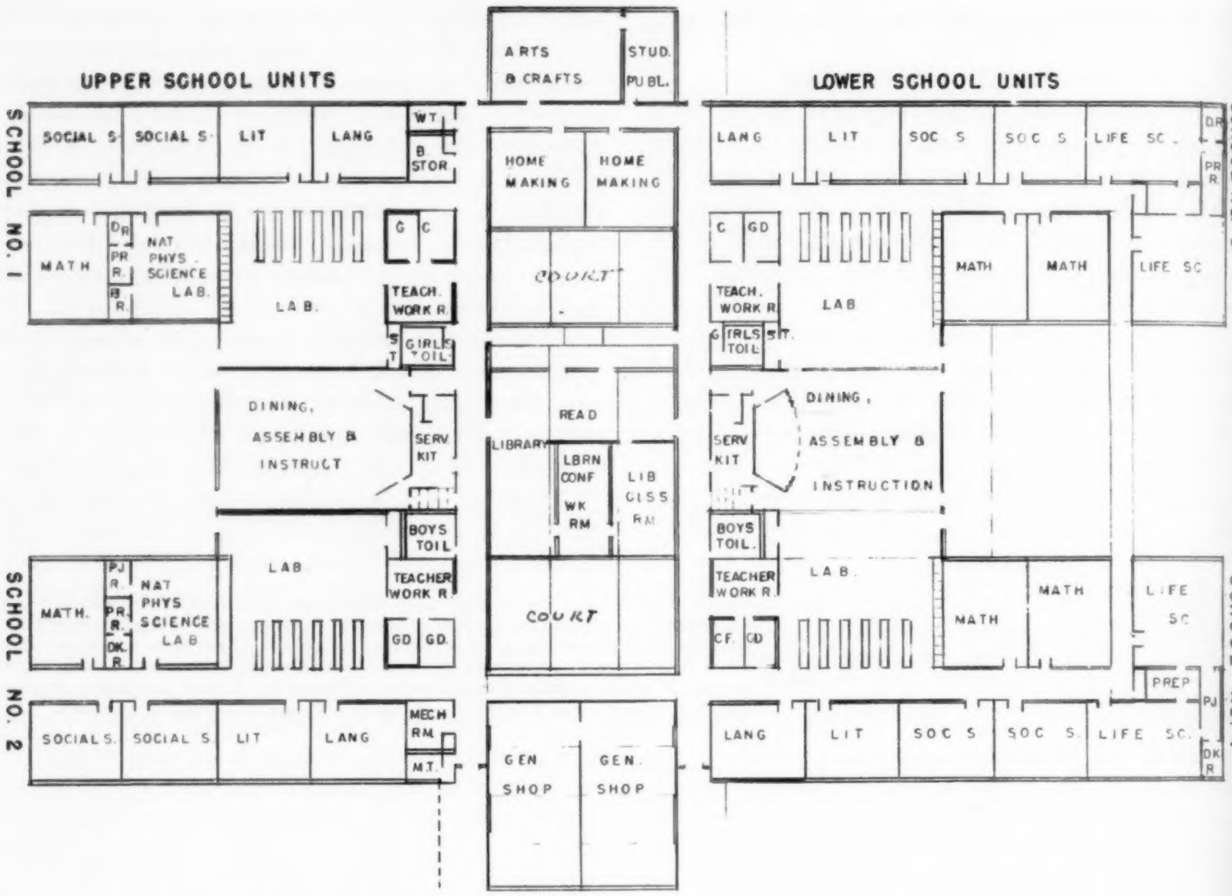
A different and deeper approach to the little school plan is one that reduces the size of the little school still further, until a group of eight to ten teachers works with 250 to 300 students for a major portion of the day, not only to create a humane scale within a large institution, but also to provide intellectual cross references among subject matter areas.

This type of little school, with emphasis upon a broadly conceived general education program, is illustrated in the new high school for Syosset, Long Island, Dr. Ernest F. Weinrich, superintendent; in several secondary schools in Lower Merion Township, Pennsylvania, Dr. Philip U. Koopman, superintendent; in Hagerstown, Maryland, William M. Brish, superintendent; and in the new Junior-Senior High School in North Colonie, New York, Edgar S. Pitkin, supervising principal. The program and planning for this approach to the little school is described in detail in *Planning Secondary Schools for General Education Programs* by N. L. Engelhardt, Jr.[2] Included in the monograph is a program schedule that is adapted from one developed in the Lower Merion Township school system by Superintendent Koopman and Assistant Superintendent Elwood L. Prestwood.

On this deeper stratum of operation a school within a school is reduced in size to 250 or 300 students, as a rule. This group is closely identified with a team of eight to ten teachers who have a broad range of subject matter competency. The teachers assume broader

[2] Engelhardt, N. L., Jr., *Planning Secondary Schools for General Education Programs*, Engelhardt, Engelhardt and Leggett, New York 19, New York, 1955, 29 pages.

The little schools for the Syosset High School are now four in number and are supported by a substantial number of specialized spaces. Many organizations have been developed vertically so that the students remain in the little school for their entire time in the secondary school. Physical education facilities provide for a heavy intramural program that anticipates several hundred students using the physical education plant in the afternoon and evening. Eggers and Higgins, architects.



Partial plan of the North Hagerstown, Maryland, High School shows a highly developed little school approach. Each unit has a laboratory or general work area adjoining—a cafeteria, assembly and instruction multi-use space to be shared with another little school. Cafeterias are serviced by food carts from a central kitchen. Architects are McLeod and Ferrara.

responsibilities than the usual academic program implies in that they are responsible for developing each student as far as he is able and with full recognition of his abilities and limitations, carrying beyond the individual teacher's subject area.

The team of teachers analyzes each student, bringing to bear the judgment based on the various aspects of the program with which the student is involved. The program can be adjusted for each student so that his weaknesses, say in English, are attacked by social studies, science and mathematics teachers as well. The strengths of each student can be capitalized upon, by providing for individual work often far in advance of the work of his class group. The guidance aspect of the little school can be strengthened by gaining greater specificity within a smaller group.

All of these things can be and are, to some extent, done in a traditional school. The design of the building can, however, emphasize the intention by physically concentrating attention upon the smaller unit and by giving the smaller unit a focus of activity.

Out of the need for space for individual activity and of the desire to focus attention upon the meaning of the smaller group has evolved the general work area for a little school. This room, often gained by reducing classroom size and including corridor space, becomes the center of the little school, its place of assembly, its own library service, its work area for individual student projects, and its space for teachers and for guidance conferences. The room has been described as follows:

> Closely associated with guidance in the development of interests is the general education laboratory. The general education laboratory is the commons, the workroom, the study hall for the individual center. It is the place where teachers may meet to plan their programs. It is the library to which students may turn for research materials. It is the place where all of the students in the center assemble, where they may learn to feel themselves a part of a group. The general education laboratory has work tables, sinks, work benches, storage facilities; it is equipped for almost every kind of creative work which may be part of the program. It is the place where the brilliant science student

may move forward on projects of his own. It is the place where the student who needs help in reading may find assistance. Here is a study hall where students may concentrate on the text or, in fulfillment of a broader purpose, may carry out projects. The general education laboratory is in many respects a new facility demanded by the "schools within a school" organization and not found in most high schools today. It promises to do much to correct the lack of integration which has always been felt in departmentalized subject matter.[3]

A Workroom Program

Under good conditions, the little schools with general workrooms would operate in a program where students and teachers are scheduled into the units for large blocks of time. The teacher would be free within the program to devote time to individual students using the resources of the work area, the conference space, the library area and the classrooms. Some of this time can be provided by utilizing larger work areas for teaching larger classes where the increased size of the class represents no handicap to learning. For example, two or three classes may be viewing and discussing a motion picture that relates to the studies under way in each class, with one teacher heading the large group and the other two teachers working with a few students.

Program Changes Are Not Forced

Providing educational scale in the secondary school does not force changes in basic educational programs. In a school designed on either of the levels discussed, as traditional a school as is desired may be operated.

[3] Engelhardt, N. L., Jr., *Planning Secondary Schools for General Education Programs*, Engelhardt, Engelhardt and Leggett, New York 19, New York, 1955, page 7.

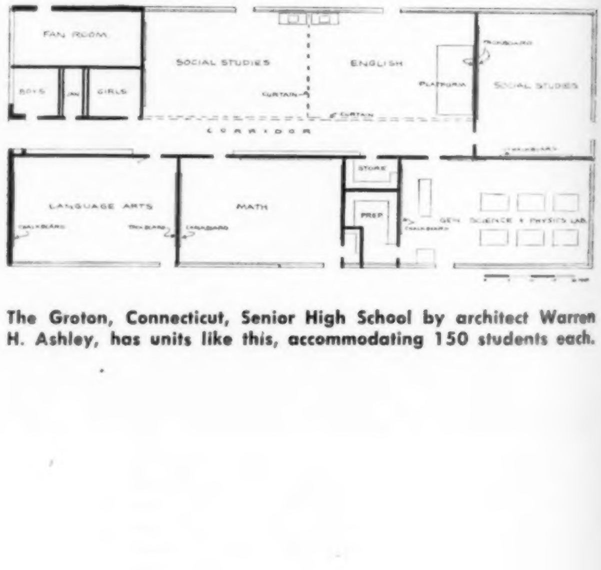
J. A. Glenn

North Colonie Junior-Senior High School in Albany County, New York, has its specialized facilities, and those receiving heaviest community use, located at one level. Library and administration facilities are located between the two major areas of the school. The Office of Henry L. Blatner, Architect, is the architect.

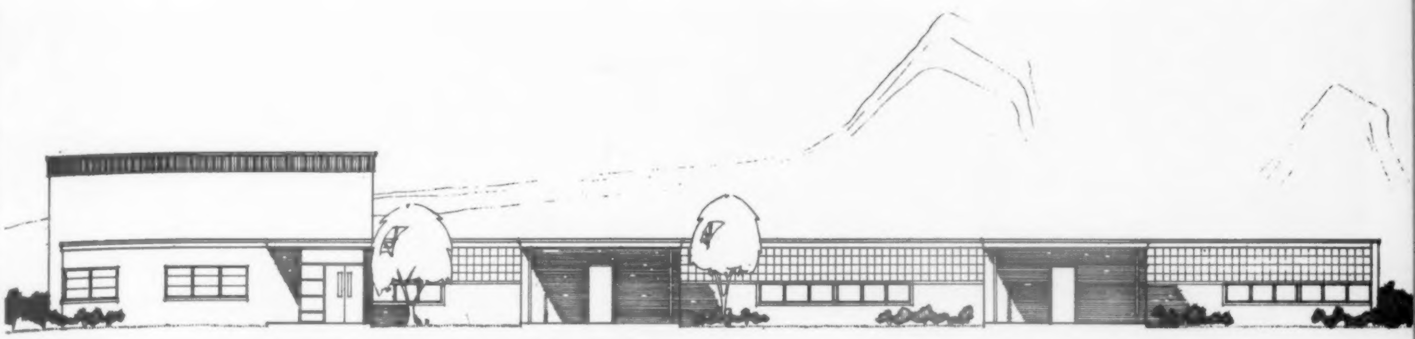
On the upper level of the North Colonie Junior-Senior High School are two little schools for the junior high students. These are found in the top portion of the plan. Below the library are the units which serve the senior high school grades.

The approach does, in the opinion of many educators who have studied the problem, offer opportunities to develop closer relationships of staff and students and closer relationships of educational fare to the needs and abilities of students. The latter point implies substantial lifting of the intellectual standards required of able students as well as modificators to suit the abilities of those who are less able.

There are many possibilities of progress inherent in a school building which is planned for educational and personal scale.



The Groton, Connecticut, Senior High School by architect Warren H. Ashley, has units like this, accommodating 150 students each.



There are no fixed wall partitions or classroom corridors in the North Elementary School, Chelsea, Michigan. Louis C. Kingscott & Associates, Inc., Architects.

THE PARTITIONLESS SCHOOL IN CHELSEA, MICHIGAN

by CHARLES S. CAMERON

Superintendent of Schools, Chelsea Agricultural Schools, Chelsea, Michigan

Mr. Cameron taught and coached football, basketball and baseball from 1937–47, was principal from 1947–52 and became superintendent in 1952—all in the Chelsea High School. He has a B.A. degree from Kalamazoo College and has an M.A. from the University of Michigan.

and CARL B. OLLILA

Educational Consultant, Louis C. Kingscott & Associates, Inc., Kalamazoo, Michigan

Mr. Ollila taught in the public schools of Michigan for 6½ years before his present position. He also served overseas with the U.S. Army from 1942–46. He has an A.B. degree from Northern Michigan College of Education and an M.A. from the University of Michigan.

NORTH Elementary School, the school without corridors or partitions, grew out of conditions not unlike those present in many rapidly growing communities—a pressing need for more educational facilities. While the problem of providing space for the increase in school enrollments in Chelsea, Michigan, is very similar to the problem in other communities, the solution—a unique design for a friendly, expandable school—is quite different.

Chelsea, Michigan, is a small manufacturing community in southeastern Michigan, fifty miles west of Detroit and fifteen miles west of Ann Arbor. It has five major industries and is surrounded by rich farm lands and resort areas. Because of its desirable location and attractiveness to industry, the village has grown very rapidly, and the village school system has been expanded to serve the needs of the area.

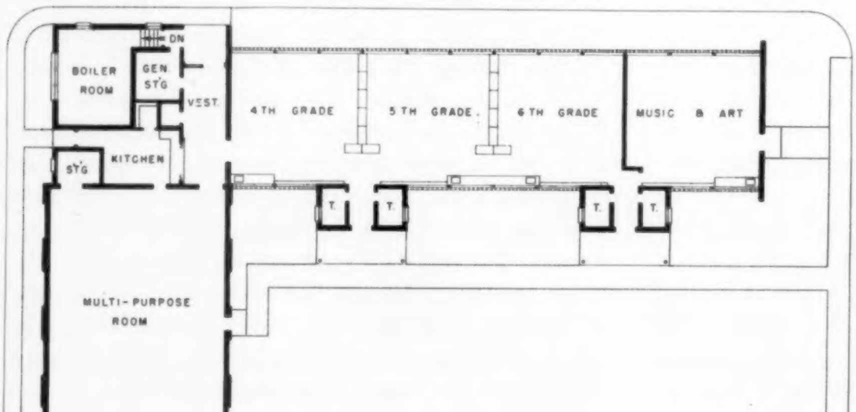
The board of education of the Chelsea Agricultural Schools, faced with the problem of providing additional facilities, at first considered adding to its existing structures. However, the school board knew that it must provide for more than the immediate needs of the district and sought consultative assistance. Mr. Wilfred Clapp, assistant state superintendent of public instruction, suggested that the local board find a school site on the north side of town.

This recommendation was based on a number of important reasons. First, the presence of a high-speed railroad through the center of Chelsea was a definite safety hazard. Second, the Michigan Department of Public Instruction preferred to keep elementary schools at a size no larger than two complete sections (fourteen rooms). Third, there was a sufficient concentration of pupils in the area on the north side of town. Finally, a site in this area meant a proximity to bus routes. Mr. Clapp recommended that the board give serious consideration to acquiring a new site in this particular area where an efficient, flexible and friendly school building would serve the needs of the community.

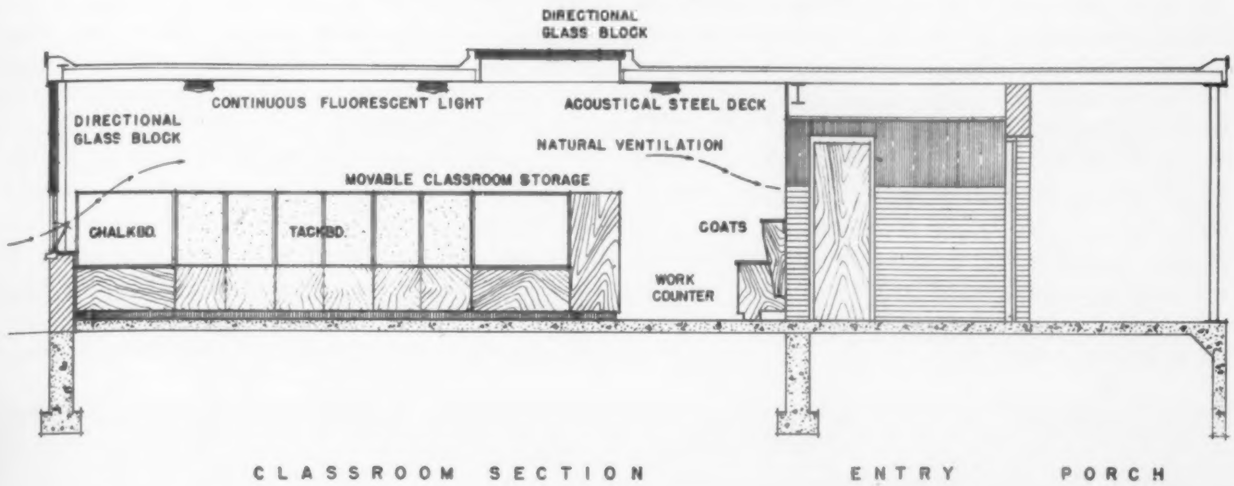
The Building Plan Takes Shape

The board of education accepted these recommendations and retained the services of Louis C. Kingscott and Associates, Inc., Architects-Engineers, to prepare preliminary sketches of the building. The school board showed a willingness to explore possibilities in design, and eventually approved a series of learning spaces which represented quite a radical departure from con-

Movable, sectional storage cabinets with tackboards and chalkboards mounted on them replace the conventional fixed partitions between classrooms in the North Elementary School, the partitionless school. There is one partition between the music room and the sixth grade classroom. The cabinet divisions allow flexibility and variations in room arrangements. After a trial period of adjustments by students and teachers to their new school building without fixed partitions, class sessions settled down to the normal routine of any other school.



The North Elementary School is U-shaped, with a primary wing for the kindergarten, first, second and third grades and another wing for the fourth, fifth and sixth grades and the music and art room. A large multi-purpose room is located between the wings and is flanked by the service areas and administration rooms.



A directional glass block skylight permits the utilization of natural light for the inner portion of the classroom. Continuous fluorescent lights provide artificial light.

The multi-purpose room of the school is adjacent to the kitchen and is used for the serving of school lunches as well as many other class activities.

The porch entryways into every two classrooms each contain toilets for the rooms.

ventional classrooms. The building was to have no fixed wall partitions and was to be without corridors in the classroom wings.

Movable, sectional storage cabinets with tack and chalkboard mounted on them replace the conventional fixed partitions between classrooms, except for the partition between the music-art room and the sixth grade classroom. The cabinet divisions allow flexibility in room size and variation in room arrangements. Class size and pupil load adjustments can be easily made whenever future enrollment problems require changes.

The offices, lobby, multi-purpose room, kitchen and storage and the boiler room form the base for this U-shaped building. Primary rooms and the kindergarten occupy one branch of the U. Intermediate rooms and the music-art unit make up the other. The wings contain no separate corridors as such.

Adult Use of the Building

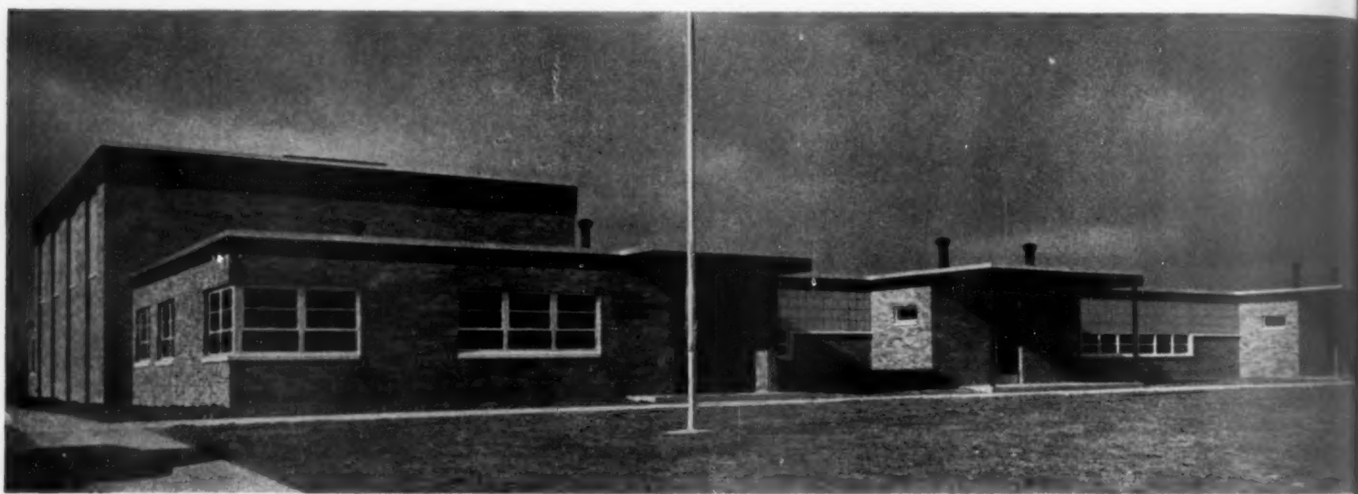
Wood paneling, contrasting with face brick in the lobby, is the setting for display cases and furnishings.

The lobby, adjacent to the multi-purpose room and its kitchen, was made large enough to be used as a community center. The lobby and multi-purpose room can be used for adult gatherings without opening classroom wings to the public.

Redwood fascia around the one story classroom wings and a green tone of wider, corrugated asbestos sheet fascia on the higher multi-purpose unit add a pleasing note of color. Plywood wall treatment at room entrances and vari-colored tile have continued the bright touch created for the building with different colors for the outside doors.

exits at the close of the school day was conspicuous by its absence. The children had no need to rush, since there was an outside door directly adjacent to each classroom area. Pupils also liked the accessibility of toilets in the vestibules.

Teachers found it necessary to make certain adjustments in teaching and planning. They scheduled similar class activities to occur at the same time, and this has minimized interference from one section to another. Adequate acoustical treatment has reduced classroom noise to an entirely satisfactory level and teachers have found that voice modulation has been



A bright note of color is added to the exterior appearance of the North Elementary School with the addition of redwood fascia around the one story classroom wings and green sheet fascia of corrugated asbestos around the higher, multi-purpose unit.

successful in getting and keeping the attention of pupils.

The school year was almost half completed when the building was ready for occupancy. Five of the seven instructional spaces were used for the remainder of the school year. All seven teaching areas are in use this year.

Adjusting to the School

At first, there was a trial period when teachers and pupils had to make adjustments to the new school. The departure from conventional classrooms was quite marked since the usual wall partitions were absent. Visiting teachers expressed concern about the absence of the partitions and about possible noise interferences. The teachers of the North Elementary School, however, quickly adjusted to their new type of teaching station.

During the first days in the new school building the pupils reacted in quite a normal way. There was a tendency to be curious about what other learners were doing, to loiter at the drinking fountains, to crane necks when visitors came to the school. After the newness wore off, pupils became more interested in the activities of their own groups and paid little attention to what others in the building were doing. The rush for the

Evaluating the Results

Further evaluations of the design will undoubtedly be made. Thus far, the following appear to be outstanding results of the new partitionless school:

1. Since equipment and partitions can be easily moved, a wide variation in class arrangements can be effected to adjust to differences in class size and activity.

2. Children have a relaxed learning environment.

3. A rush for exits does not take place when classes are over.

4. Noise levels do not interfere with normal class activities within the building. Children pay little or no attention to what other groups are doing.

5. Visitors to the school have been impressed with the cheerfulness of the building.

In summary, Chelsea has a new elementary school building which has proved to be an efficient, flexible and friendly place for students and teachers alike.

A CENTRAL SCHOOL LUNCH KITCHEN AT WORK

by KATHERINE K. DOOLEY

Director of School Lunch, North Colonie Central Schools, Newtonville, New York

Mrs. Dooley has a bachelor's degree from Russell Sage College and has completed some graduate work at Syracuse University and Columbia University. She has had varied experience as a dietitian and manager of kitchens and dining rooms for institutions and private schools. Mrs. Dooley also taught at the New York State Technical Institute at Delhi. Prior to her present position she was assistant supervisor on the school lunch program for the State of New York.

MAINTAINING a central kitchen for the school lunch program of a school district is a most effective way to prepare lunch for schools in different locations. The process of preparing the food in such a central kitchen, transporting it to the individual schools and serving it while hot has advantages in reducing space requirements, equipment, maintenance and labor costs, personnel problems and food waste. It also has the advantage of concentration of control in such matters as budgets and accounting, economical quantity purchasing and storage, standards of preparation, quality of food and program supervision.

The North Colonie Central School District covers a very large and rapidly expanding residential area near Albany, New York. The school district has been confronted with the construction of new schools and the addition of new programs. Among the latter was the inauguration of a school lunch program.

At the time of initial program planning, two schools had no facilities for school lunch. Faced with the construction of two new schools and an addition to a third school, the board of education felt that a central kitchen would be the most feasible and economical way to serve the five schools. The experiences of actual operations have proved the planning to be so valid that a lunch program for seven schools will operate from the same central kitchen this year.

Location of the Kitchen

The central kitchen is located in the Blue Creek School, one of the newer schools with an enrollment of about 425 pupils. The school building was con-

Food prepared in the central kitchen of the North Colonie School District is served in the hall of the Goodrich School. Portable tables are set up as serving counters for the children, who dine in their classrooms.

The central kitchen for the North Colonie Schools is located in the Blue Creek School. Hot food carts from the kitchen are loaded into a truck for delivery to the other schools.

Robert C. Jackson

structed with a combination room utilized as an auditorium and dining area. A cafeteria serving room is adjacent to this room and the kitchen.

In the Forts Ferry and Loudonville schools, each enrolling about 425 pupils, combination rooms are utilized for dining and special arts and crafts classes. Adjacent to these combination rooms are cafeteria serving rooms, with direct access to loading platforms. They are equipped with modern facilities for dishwashing and garbage disposal, as well as small auxiliary cooking and refrigeration facilities for community activities.

The Serving Facilities

Instead of steam tables, the serving counters are arranged with a space to receive heated food carts from the loading platforms. In the line of service at these counters also are milk dispensers, ice cream freezers and a serving table space of stainless steel. These serving arrangements equal those in schools where the food is prepared in an adjacent kitchen.

The two olders schools, Latham and Goodrich, have no dining facilities and require temporary but quite satisfactory arrangements. In these schools folding serving tables are set up in the corridors. Hot food is received from the central kitchen in vacuum containers which are divided into serving pans. The folding tables are the only special equipment required at the two schools. The classrooms are used for dining. These schools have an enrollment of about 325 and 150 pupils, respectively.

The central kitchen at the Blue Creek School is

A hot food cart has arrived at the Loudonville School. The cord is plugged in to keep the food hot while it is served to the pupils.

arranged and equipped for specific units of work. In the ample floor area, workers and equipment are not crowded. The area is comfortable and well ventilated by a large exhaust fan over the cooking and baking sections and a smaller one at the dishwashing unit.

The baking unit has two double tier, gas heated bake ovens, a large floor type electric mixer, pan racks, a baker's table, large portable flour and sugar bins and a pot sink with a disposal unit. The cooking unit has three institutional gas ranges with ovens, an electric potato peeler, two steam jacketed kettles of thirty gallons capacity each, a large steamer for meats and vegetables, a vegetable sink, pot sink, electric slicer and a bain-marie.

The salad area contains a preparation table, refrigerator and sink with disposal unit. The dishwashing section has an electric dishwasher with a booster hot water heater and a prerinse sink with a disposal unit. Adjacent to the kitchen is a large storeroom, a walk-in cooler and a walk-in deep freeze, as well as the manager's office and a loading room platform. The serving room at this school differs from the others only because it is equipped with a fixed hot table.

Transporting the Food

The transportation of food is an interesting feature of the hot lunch program in operation. The electrically heated carts, which double as hot tables at the Forts Ferry and Loudonville schools, are insulated and equipped with temperature controls. Plugged into electric outlets, they are warmed about an hour before the food, in round and oblong serving pans, is placed in them on enclosed racks.

Upon arrival at their destination, the carts are wheeled into position in the serving counters and plugged into electric outlets. The tops are removed and the serving pans are transferred from the racks to receptacles in the tops of the carts. The carts also serve as holding ovens.

The vacuum containers used for the Latham and Goodrich schools are cylindrical and hold four serving pans, each of two-gallon capacity. The containers are preheated with hot water and can maintain heat for as long as 24 hours. At serving time the pans are transferred from the container to the portable serving tables. Large oblong plastic containers are used for sandwiches, breadstuffs and desserts.

All items are transported in an insulated school truck that is especially adapted to the purpose. The truck has an hydraulically operated tail gate for different level loading platforms, folding shelves for the plastic containers and fasteners to hold the food carts and vacuum containers. The truck is operated by a school bus driver who is hired by the central kitchen for four hours each day between his regular school bus runs. At other times the truck is used for various school purposes and has transported government surplus foods for the kitchen at less cost than hiring outside truckmen.

Personnel for the Lunch Program

Personnel for the operation are mostly housewives with school age children and a need or interest in part-time work. Recruitment has never been a problem and a long list of applicants supplies an ever-ready source of substitutes if needed. The central kitchen is staffed with a cook and assistant; a baker and assistant; a salad and sandwich maker and assistant; a dishwasher and a counter and storeroom worker. These eight persons are employed seven hours a day, but at the four outlying schools the work day is shorter.

In the Latham and Goodrich schools the lunch servers are employed two and a half hours a day since the schools have no serving rooms or dishwashing facilities. In the other two schools the workers are em-

Hot lunches are served to children of the Latham School. The hall is used for this purpose. Pupils carry the trays to their classrooms and eat there.

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ployed four hours a day and, during the actual serving period, they are assisted by two workers who travel over in the truck from the central kitchen. These two workers return to the central kitchen when the empty food carts are picked up.

A Typical Day

On a typical day in the central kitchen the workers sign in at eight o'clock in the morning. White uniforms, hair nets and comfortable shoes are a must. They refer to a work sheet prepared a week in advance for each day, showing the work required at each operating unit. Recipes for food preparation are attached and any preparation for the following day is also noted.

Each unit, such as baking, cooking or salad, requisitions needed supplies on a standardized storeroom form. The storeroom keeper and dishwasher fill the requisitions and deliver the supplies. At 9:30 A.M. the outlying schools report by telephone the number of lunches needed that day. These orders are recorded on small sheets of paper which also show the size and number of portions to be served. The sheets are processed for order filling and are forwarded on the delivery truck for the information and guidance of servers in the outlying schools. Each order contains an average of ten extra portions to offset any spillage.

While cooks and bakers are preparing food, the storeroom keeper checks stock levels and makes up packages to replenish supplies of aprons, towels, washing powders, catsup, sugar and other articles for the outlying schools. After this, the dishes and other serving equipment are packed for the two schools which do not have serving rooms. At 10:15 A.M. everyone helps to load the food carts and containers and the delivery truck starts out by 10:30.

The Serving Begins

All schools begin serving at 11:30 A.M. and are finished by 12:45. Once the truck leaves the central kitchen the workers return to their units to clean the utensils and begin preparations for the next day. The same workers also prepare the serving room and serve the school lunch at the Blue Creek School.

At one o'clock the truck begins its rounds to return the empty carts, containers and soiled dishes to the central kitchen. All returned dishes and equipment are then cleaned and the working area is mopped. The end of the work day comes at 3:00 P.M.

A complete "A" type lunch, as outlined by the Federal School Lunch Program, is served and menus for each school day are sent to parents once a month.

At the beginning of school each day, teachers find out the number of lunches needed by their classes, issue tickets and collect the payment for them. This count and money are collected by the clerk in the principal's office and the total count is telephoned to the central kitchen. All money is counted and placed in a locked bag and forwarded to the school lunch director on the delivery truck. Tickets are collected from each child when served.

The food is served on plastic compartment trays colored yellow or coral. These are lightweight and easily handled. Other than the trays, the only dishes used are plastic soup bowls. All bread and rolls are buttered and the meat is prepared so that knives are not needed. During the lunch period the children are supervised by their teachers until they return their used trays to the soiled dish window.

Control of the lunch program and its operations is concentrated in the director's office at the central kitchen. All lunch money is collected here, receipts are checked and bank deposits are made up. Cost controls and comparisons of operations in all schools are maintained. Incoming food, supplies and invoices are checked and a continuous inventory is kept.

Advantages of Centralization

This centralization permits large quantity purchasing and an opportunity to attract and deal with special offerings of wholesalers. Storage in the walk-in cooler and deep freeze makes possible economical purchases of meats and other perishables which decentralized kitchens could not accommodate. One of the most important items under this arrangement is the keeping and accessibility of records, particularly for monthly reports for the Federal Government and the board of education.

Is a central kitchen serving several schools feasible, practical and economical? The central kitchen for the North Colonie Schools has proven that it is and, what is more, it has operated successfully during its first year of operation.

The homemaking cottage for the Perrin, Texas, Independent School District was designed by Stanley Brown, architect of Dallas. The cottage houses a one-teacher homemaking department and also serves many community functions.

A HOMEMAKING COTTAGE TO SERVE SCHOOL AND COMMUNITY

by STANLEY BROWN

AIA, Architect, Dallas, Texas

Stanley Brown received his higher education at Texas Technological College at Lubbock, and at the "T" Square Club of Philadelphia. He has practiced architecture in Texas and the Southwest for twenty-five years. Most of his work has been designing school buildings.

THE hue and cry today is for our schools to become an integral part of the community, and the school authorities at Perrin, Texas, have undertaken to accept this challenge. As a first step in this direction, the high school homemaking teacher and the area supervisor requested the construction and equipment of a modern homemaking department.

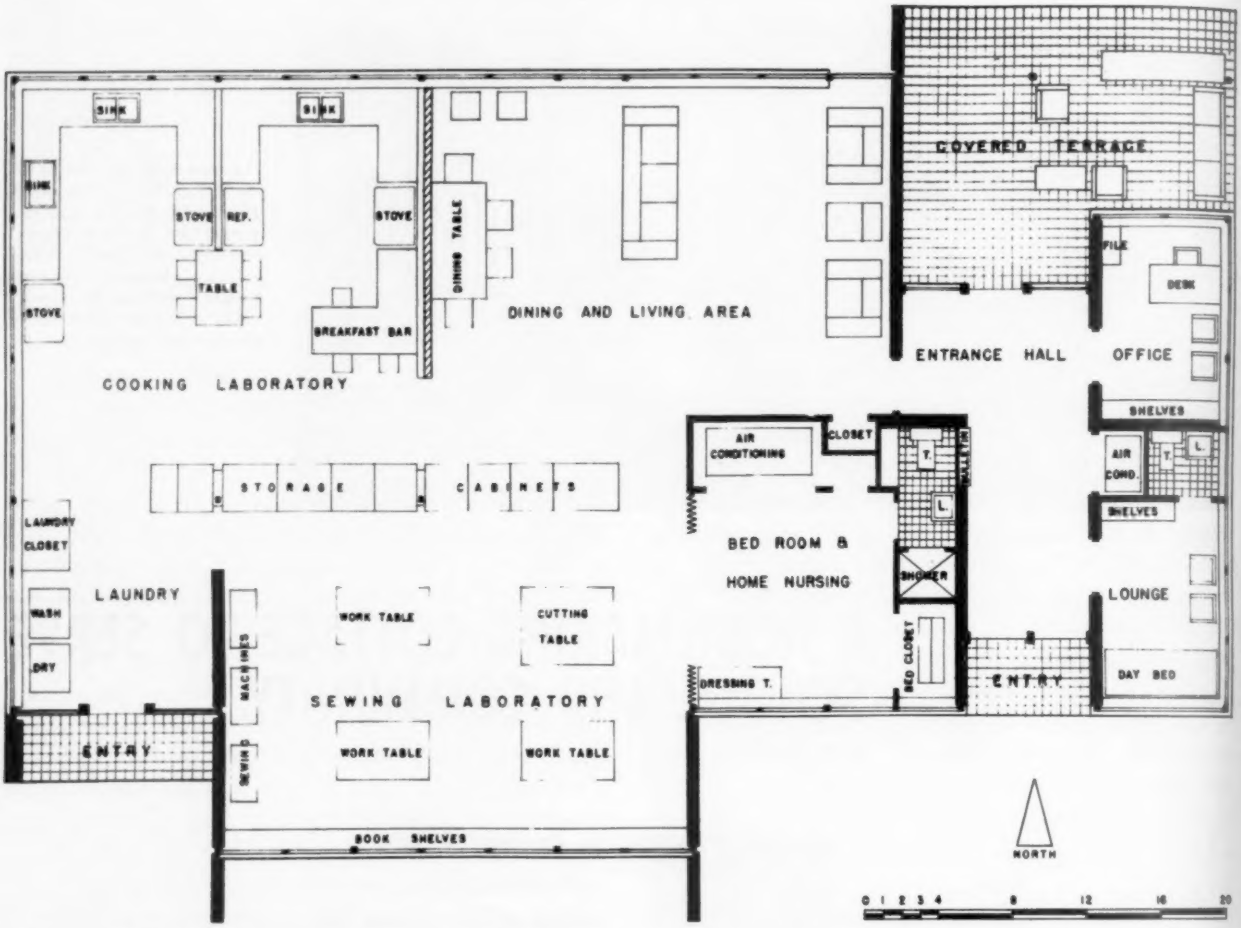
The conditions of the school site warranted the construction of a separate building for the department and it was decided that a cottage would best serve this need. The problem was to design a building to house a one-teacher homemaking department for the teaching of cooking, clothing, child care and home nursing. In addition to the normal use of such a department, the building was to serve community functions, such as home demonstration work and various women's club activities.

Since the entire cottage would be under the direction of only one teacher, the laboratory facilities were designed to be housed in an open area with only partial separation between each teaching space. Such open planning enables the homemaking teacher to supervise as many as three groups of students at a time from one position.

Inside the Building

A small entrance hall serves as a lobby and allows privacy for the teacher's office. Opening onto this hall is a ladies lounge, used by teachers and visitors. The hallway opens to a covered outside terrace at the rear of the building. A group of door-height storage cabinets separates the clothing laboratory from the living-dining area and the cooking area.

Adjoining the clothing laboratory is a bedroom equipped with a bed closet. The bedroom is also used for the teaching of home nursing. This area may be



The Perrin Homemaking Cottage has three entries. The main entrance hall is reached from a covered terrace. The units of the cottage include an office, lounge, bedroom and home nursing area, dining and living area, sewing laboratory, cooking laboratory and laundry. A folding partition closes off the home nursing area from the remainder of the cottage. The entire structure is air-conditioned.

The living area is divided from the cooking laboratory by a wood screen with vertical louvers. A section of storage cabinets contains magazine racks and bookshelves.

The kitchen area has three unit kitchens and a breakfast bar located near the passageway which leads to the living area. The sink cabinet drainboards are of three different materials—tile, rubber and plastic. Two table-top gas ranges and one electric range are included. There is one refrigerator for all three units.

separated from the clothing laboratory by the use of a folding partition. The clothing laboratory has three worktables and a large cutting table. Storage for tote-trays containing the work of each student is provided in neat birch cabinets. These cabinets are faced with full length mirrors, which are used in fitting clothing. Additional storage is provided for hanging articles of clothing.

The laundry is equipped with a washing machine and a dryer. This space is located at a service entrance between the clothing laboratory and the kitchen area.

The Kitchen Area

The kitchen area contains three unit kitchens, employing a U-shaped, an L-shaped and a straight design for the sink cabinets. The cabinet drainboards are made of three materials–tile, rubber and plastic. The various materials are used in order that students may see the advantages of each particular type. Two table-top gas ranges and one similar type electric range are used in the kitchen. An electric refrigerator serves all three kitchen units. A breakfast bar is provided near the passage to the living-dining area. Cabinets above and below the sinks afford storage for dishes, utensils and food.

The living-dining area is separated from the cooking laboratory by a wood screen of vertical louvers. A section of the storage cabinets opens to the living room and contains magazine racks and bookshelves. The spaciousness of this area allows a dual function of living room and dining room.

Figured birch plywood in a natural finish and the red brick walls give the interior an atmosphere of warmth and functional beauty. The hallway floor is red quarry tile; the living room, bedroom, clothing laboratory, office and lounge floors are cork tile; the kitchen and laundry floors are asphalt tile; and the rest room floors and wainscots are ceramic tile. All floors are placed on concrete slabs. All ceilings are of machine-applied acoustical plaster in an off-white natural color. These

The cabinets in the sewing laboratory are faced with full length mirrors. The area has three worktables and a large cutting table.

ceilings are supported on metal lath applied directly to the bottom of the sloping steel roof joists.

The building is faced with a warm red brick of velour finish. Many projected steel windows are used. These windows are glazed with clear glass except for an occasional one fitted with asbestos board containing an insulated core. The asbestos board glazing is painted in bright colors to give an added appeal to the exterior. The roof deck is of gypsum covered with a built-up white marble chip roof.

Keeping Cool in Summer

Two units furnish year-around air conditioning. Such cooling in a climate known for its extreme summers is a boon for off-season community use of this cottage. Artificial lighting is accomplished by the use of concentric ring incandescent fixtures.

The building has been in use for a year and proof of its versatility is steadily increasing. The school children are very proud of their unusual laboratory and the teachers enjoy the breakfast bar at coffee hour. Almost every night there is a community meeting or an adult homemaking class in the cottage.

The school authorities, the area supervisor and the homemaking teacher were very helpful in the planning of all phases of the cottage. The building contains 2,362 square feet of area and was built at a cost of $40,290, exclusive of the architect's fee.

Cabinets above and below the sinks provide ample storage for items.

This new school bus garage is the headquarters for Fayette County's pupil transportation system. John F. Wilson of Lexington, Kentucky, is the architect of the building.

BUS GARAGE AND TRANSPORTATION PROGRAM FOR FAYETTE COUNTY SCHOOLS

by Louis A. Yandell

Supervisor, School Bus Operation, Fayette County Public Schools, Lexington, Kentucky

Mr. Yandell is a graduate of Western State Teachers College in Kentucky. He taught history, physical geography and distributive occupations in the high schools of Fayette County for eighteen years. He has held his present position since 1949. Mr. Yandell has completed graduate work at the University of Kentucky and the University of Tennessee. He is presently a member of the Executive Committee on Pupil Transportation, Department of Rural Education, NEA.

IN the driver waiting area in the Central School Bus Garage for Fayette County, Kentucky, this happens each school day morning about 6:40 A.M. One of the first drivers to leave says to the other drivers, "Let's get this show on the road." This sets in motion Fayette County's Pupil Transportation System, the largest publicly owned system in Kentucky.

The present pupil transportation system had its beginning in the spring of 1949. It was at this time that the County Board of Education, through the leadership of three newly elected members including the board chairman, saw fit to make a change in the administration of the schools by employing a new superintendent of schools.

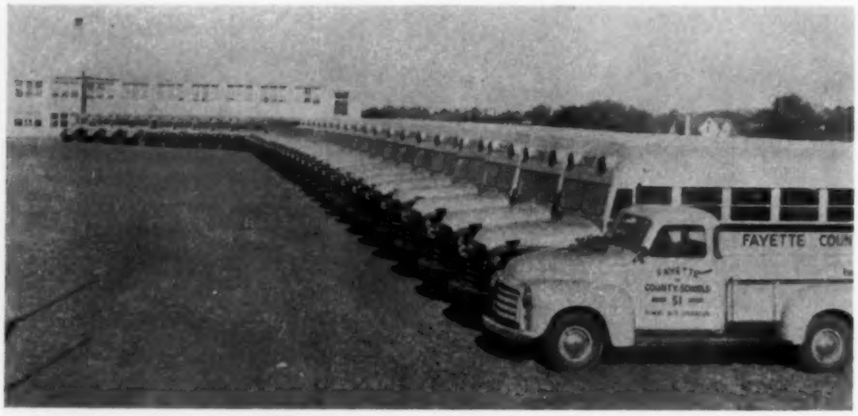
As part of the general change in administration and policies, the board appraised the existing pupil transportation system, which was a contract system with three private operators. After considerable study and fact finding, the board reached two major conclusions:

1. The cost per pupil was too high.
2. The board should have complete control over the pupil transportation system.

As a result of these conclusions, steps were taken to assume complete responsibility for this auxiliary service. The private operators were asked to set a price on their equipment, which consisted of 36 school buses of various makes, models and years of service. At the same time, the board asked for bids on 40 new bus chassis and bus bodies.

A Supervisor Is Appointed

At this point, the present supervisor came fully into the picture. He was asked by the board to take charge of the entire pupil transportation system under board ownership. He had been with the Fayette County School System as a high school teacher since graduation from Western Kentucky Teachers College in 1930. He



This is the original fleet of forty buses purchased by the Fayette County Board of Education in 1949.

had been connected with pupil transportation in the county on a part-time basis since 1941, when he was employed by one of the private operators to assist with bus routing and to supervise the use of school buses in transporting some 2,500 trainees enrolled in a war training program at Lafayette High School under direction of the Signal Corps.

The private operators submitted prices for their equipment as requested. Bids were received from all major bus body and chassis suppliers. Bidding was extremely competitive since this was the largest single school bus order that had ever been offered for bid in Kentucky. When the bids were opened, it was discovered that new equipment could be purchased for less money than the used equipment of the private contractors. Also, the purchase of new equipment would give the new department a fair chance to maintain equipment as it should be maintained from the beginning.

The board placed orders for 36 buses of 48 pupil capacity and 4 buses of 60 capacity. The bus body order was equally divided (20 each) between the Superior Coach Corporation and the Perley A. Thomas Car Works. The chassis order was for 36 G.M.C. buses, FCS 305's for the 48-passenger bodies, and 4 K-7 Internationals for the 60-passenger bodies. Incidentally, this did not provide sufficient capacity and two more 60-passenger buses were purchased in January of 1950 to take care of an increased enrollment.

Overall Plan for the Department

In developing an overall plan for the Pupil Transportation Department it was decided that the department would employ its own personnel, submit its own budget to be carried through the board's general books, expend money from the budget through a purchase order system, keep its own records, make up its own payroll and process its own bills for payment.

This has proved to be a wise move since it has enabled the department to function with a minimum of red tape and has increased the general efficiency. The board maintains a proper check and balance on the department, since checks for all salaries and bills are written by personnel in the office of the assistant superintendent for business and are entered in the general books.

Although the new transportation system started almost from "scratch," the board did own some bus storage space that had been used by one of the private operators and some additional space that could be converted into a shop area.

The first problem to be tackled in the summer of 1949 was that of recruiting a shop crew to maintain the forty school buses to be delivered in August. The following personnel were employed: one shop foreman, one mechanic specializing in body repair, one general mechanic and one serviceman. At this point, the board purchased a heavy duty ¾-ton pick-up truck to be used as a service truck by the new department.

Tools and Equipment

The next problem was to equip the space being converted into a repair shop with the necessary tools and equipment. The board owned only one set of socket wrenches. With little previous experience in fleet maintenance, the supervisor relied to a great extent on suggestions received through conferences with shop fore-

A reaction time machine is part of the testing process for all new drivers.

A new side panel is being installed on a bus in the central garage shop.

men in several truck fleet maintenance shops in the Central Kentucky area. After refining the suggested equipment lists, it was found that certain tools and equipment appeared on all lists. These were purchased and installed, and have since been found to be essential to school bus repair and are used almost daily.

The main storage and shop area at that time consisted of the entire first floor of a 60 feet by 180 feet stone building on the Lafayette Campus. This building was constructed in connection with the war-training program of the Signal Corps. The space was already equipped with overhead doors on both sides. There was a small section in the center which was used as a stockroom and provided space for toilets.

A section of six storage spaces at one end became the repair shop. A gasoline pump with a 2,000-gallon storage tank was located at the opposite end of the structure. Six buses were stored on the first floor of a similar building located just across the driveway.

Sharing the Facilities

The unusual thing about the shop and bus storage space was that just above it, on the second floor, were located ten classrooms used daily by elementary and junior high school pupils. Of course, the arrangement was neither ideal nor desirable, but this was the only place available. You can visualize a fifth grade teacher trying to teach a spelling lesson upstairs while the bus body repairman hammers out a fender downstairs.

This situation taught us that people can work together under very trying circumstances. Certain types of shop work were limited to certain times of the day or to certain days of the week. For example: motor tune-up had to be done after classes were dismissed because of the dangerous carbon monoxide fumes. All painting was done on Saturday so that the paint fumes would be dissipated by Monday when classes resumed. Needless to say, one part of our shop men's vocabulary was considerably reduced and possibly the same part of the students' vocabulary was slightly increased.

The shop men did a remarkably good job of maintaining equipment. One thing which caught everyone off guard was a rash of tires ruined by being driven while flat without the driver's knowledge. The loss was considerable before we determined the cause and cured it—with a very simple remedy. A 25-cent hammer was placed in the glove compartment of each bus. The drivers were required to "hammer check" the rear duals every time the bus was moved. This has almost completely eliminated this problem. Some drivers can detect an underinflation of no more than ten pounds of air through this simple "hammer check."

Recruiting Capable Drivers

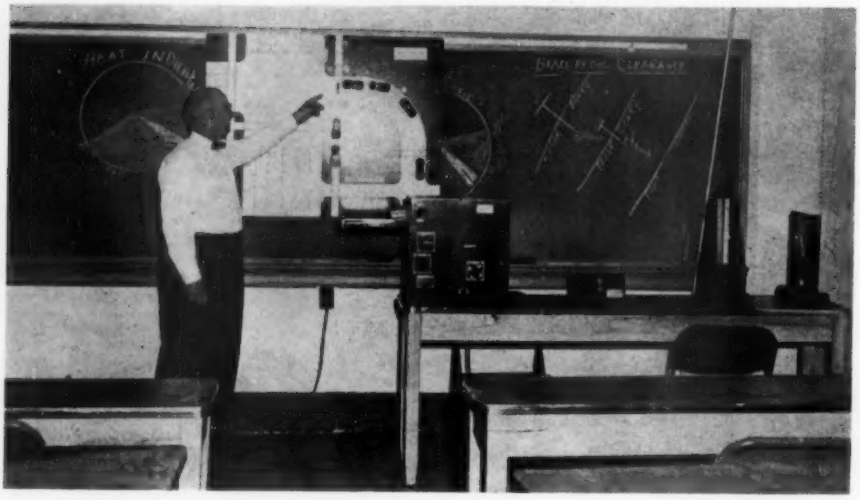
Recruiting enough capable drivers has always been quite a problem. It was especially difficult the first year. The pay at that time was only $3.00 per day. Through newspaper ads and other means, we had a driver with some training for every bus. Through a continuous system of recruiting and training, the department has thus far been able to provide reasonably competent drivers for every bus.

A New Home for the Department

As a result of the tremendous postwar increase in enrollment, it soon became evident that the classroom situation would become very acute by the start of the 1953–54 school year. Since the Pupil Transportation Department occupied parts of two buildings which were originally built for classrooms, it was decided, in the 1951–52 school year, that plans should be made to move this department to a location more desirable from every standpoint.

Accordingly, a survey was made of the board's land holdings to determine their accessibility and desirability for this purpose. The northeast corner of the forty acre tract known as the Lafayette Campus was determined to be the best location since it was near the general administration offices and near the largest concentration of pupils in the county. Utility services were also readily available at this location.

The old quarters consisted of a building with classrooms above the shop.



The supervisor points to a magnetic traffic board which is used in driver training. Other driver training equipment can be seen on the table.

An architectural firm was commissioned to prepare two sets of plans—one for converting the space occupied by the Pupil Transportation Department into classrooms and administrative offices for a newly established junior high school, and the second set for a new building to house the Pupil Transportation Department at the location selected.

The supervisor of school bus operation submitted rough sketches of the minimum essentials for the new department. These ideas were incorporated in the final plans in so far as they were practical.

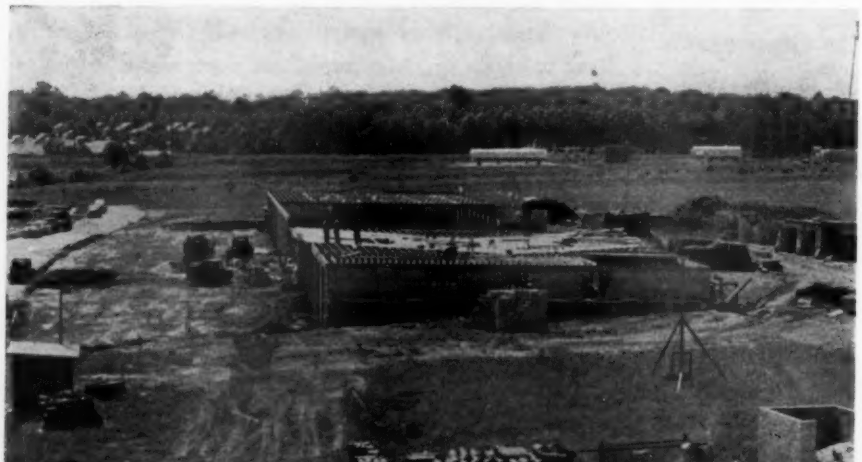
While the plans were being completed, additional money to finance the building program of the board became available in 1951, when voters in the county passed a school construction bond issue. This bond issue levied an additional tax of 32 cents per $100 on all real property assessed for school purposes.

The contract for construction of the bus garage was awarded first, since this department would have to operate while its former quarters were being converted into classrooms. The low bid on the school bus garage was $187,350. Several change orders were made with the ultimate cost of the garage and equipment being about $196,000. Construction was started in January of 1953 and was completed in November of that year.

The summer of 1953 was a very difficult one for this department. It was dispossessed by the conversion of its existing quarters into classrooms, and construction on the new bus garage had not progressed to the point where it could be even partially occupied. As a result of this construction squeeze, all the rolling stock stood outdoors and much of the repair work was done in the open during that summer. The contractor cooperated with the department by finishing the west end of the storage area in the new garage first so that a temporary office and the shop equipment could be moved to the new location while the other parts of the building were being completed.

The Main Garage

The central garage is the main facility of the department. Four other small facilities are maintained at



In 1953 the Central School Bus Garage was under construction. The old quarters were converted into classroom facilities.

outlying schools. All of these have inside storage and two of them have gasoline, oil and air available. All repair work, except of a minor nature, is done in the central garage.

This central garage has storage space for fifty buses, a complete repair shop, administrative offices, driver training room, stock room, tire repair room, tire and storage room, a large paint booth, toilet facilities and a shower room for the shop crew. It also has its own heating plant consisting of two coal burning stoker-fired boilers.

The garage is equipped with a two-way intercommunication system with nine stations inside the garage and office and one outside station. With a building more than 100 feet long—longer than a football field—this system saves miles of steps each day.

A master clock control system regulates the ten clocks located in prominent places throughout the plant, as well as the time clock punched by all employees to keep their work records. This time system provides a printed record of when each driver reports for his morning run and when the driver returns from the run. The same thing is done for the afternoon run.

The location of the time cards in the two card racks, one marked *off duty* and the other marked *on duty*, gives a quick visual check on which driver has failed to show up for his run. A substitute driver is then sent out with the bus. The clock is a valuable piece of equipment regardless of whether or not employees are paid by the hour. Actually, the only persons paid by the hour in this department are extra-help people employed to wash buses and to do clean-up work in the garage.

Equipment and Facilities

Two of the repair bays are equipped with Weaver Twin Post Lifts. The front wheel post on this type lift is moved along a track so that the post will be directly under the front axle when the vehicle is lifted. These lifts will take care of vehicles with wheel bases ranging from 108 inches to 270 inches. They enable shop men to make better inspections and to make repairs much more easily than could be done on a creeper with the mechanic flat on his back. The lifts are air operated.

The paint booth is equipped with a large suction fan for removing paint fumes. The doors to the booth have air filters, so that only clean air is circulated. A large "stir bucket" is used to enable enough paint for an entire bus to be mixed and sprayed at one time. All painting is done under natural lighting furnished by two large skylights running the entire length of the booth.

A carbon monoxide disposal system is located in the center of the six repair bays with flexible tubes leading out in all directions. The ends of these tubes are fastened to the ends of the vehicle exhaust pipes any time that a motor is run in the shop area.

The body repair section is one of the most completely equipped parts of the shop. With the metal bending and forming machines and with both electric and gas welding equipment, any type bus body repair can be made and even complete new body sections can be fabricated.

Once each year, every bus is run through a steam cleaning process in which the motor, the running gear and the entire undersection are thoroughly cleaned. Any time during the year that a motor or other large component part is removed for an overhaul, the first thing done is steam cleaning.

Many pieces of equipment in the shop were made by the shop men to perform one particular job. Since all but ten of the vehicles serviced in the shop are the same make and 36 of them are the same model, special equipment which works on one would work on most. Some examples of shop-made equipment are a transmission repair stand, a differential repair stand, a motor run-in stand, a special cleaning tank, several special pullers for gears, several jigs in the body shop and a tailor made tow-in bar.

Purchasing Gasoline

The department purchases gasoline on bids in transport lots of 4,000 gallons for the Central Bus Garage. This is stored in a 6,000-gallon tank and is dispensed through two pumps. By purchasing gasoline in quantity, a saving of nearly three cents per gallon is made. This saving is considerable since approximately 90,000 gallons of gasoline are used annually by this department. At the two small garages where gasoline is available, it is purchased in lots of 800 gallons. Tank truck price is paid for gasoline delivered to these loca-

Fagan

Powerful lifts are used to raise school buses when necessary for servicing. Lifts are air operated.

tions. The board owns all gasoline tanks and pumps at all locations.

In order to conserve manpower as much as possible, many labor saving devices were installed and labor saving tools were purchased. All oil for changes and otherwise is pumped by air-operated pumps with a metering device at the end of the hose. Refilling with oil after draining is a 30-second job. Almost all nut loosening and tightening is done with one of the three electric impact tools in the shop. All items of a heavy nature are moved with a mobile crane. Tires are lifted and spread by air.

With a reasonably small shop crew, it is not possible or economical to do all of the repair work necessary for vehicle repair in the garage shop. The following jobs are sent out to local shops specializing in this work: drum turning, radiator repair, crankshaft turning, heavy spring repair and tire recapping. Just about all other jobs, including reupholstery, are done under one roof in some section of the shop.

The Driver Training Program

The driver training room is one of the most important parts of the Pupil Transportation Department. It is in this room that drivers, new and experienced, receive continuous training in driving and safety. Driver testing equipment of many kinds is housed here. First aid classes are taught by the supervisor; all driver meetings, conferences and parties are held here. Prospective drivers fill out applications and are tested in this room. A giant map of the bus routes in the county is kept here, as well as a separate folder on each particular route. This is the location of the nerve center of the driving force.

School bus drivers are selected very carefully through the following steps:

1. Application made out in own handwriting.
2. Thorough check ride given by driver trainer.
3. Physical examination given by health department.
4. Three references sent to non-relatives.
5. Past record checked thoroughly.
6. Three days route and bus operation training given.
7. First aid training given.

Most drivers are part-time employees . . . the majority of them being housewives or students in local colleges. They work about four hours per day—one and one-half hours in the morning and two and one-half hours in the afternoon. The present pay rate is $4.20 for each day driven. The average pay is $84.00 per month. Even though the driver replacement ratio is fairly large from year to year, the safety record of the department has been exceptionally good. There has not been a serious injury to a pupil within the past seven years under the present administration.

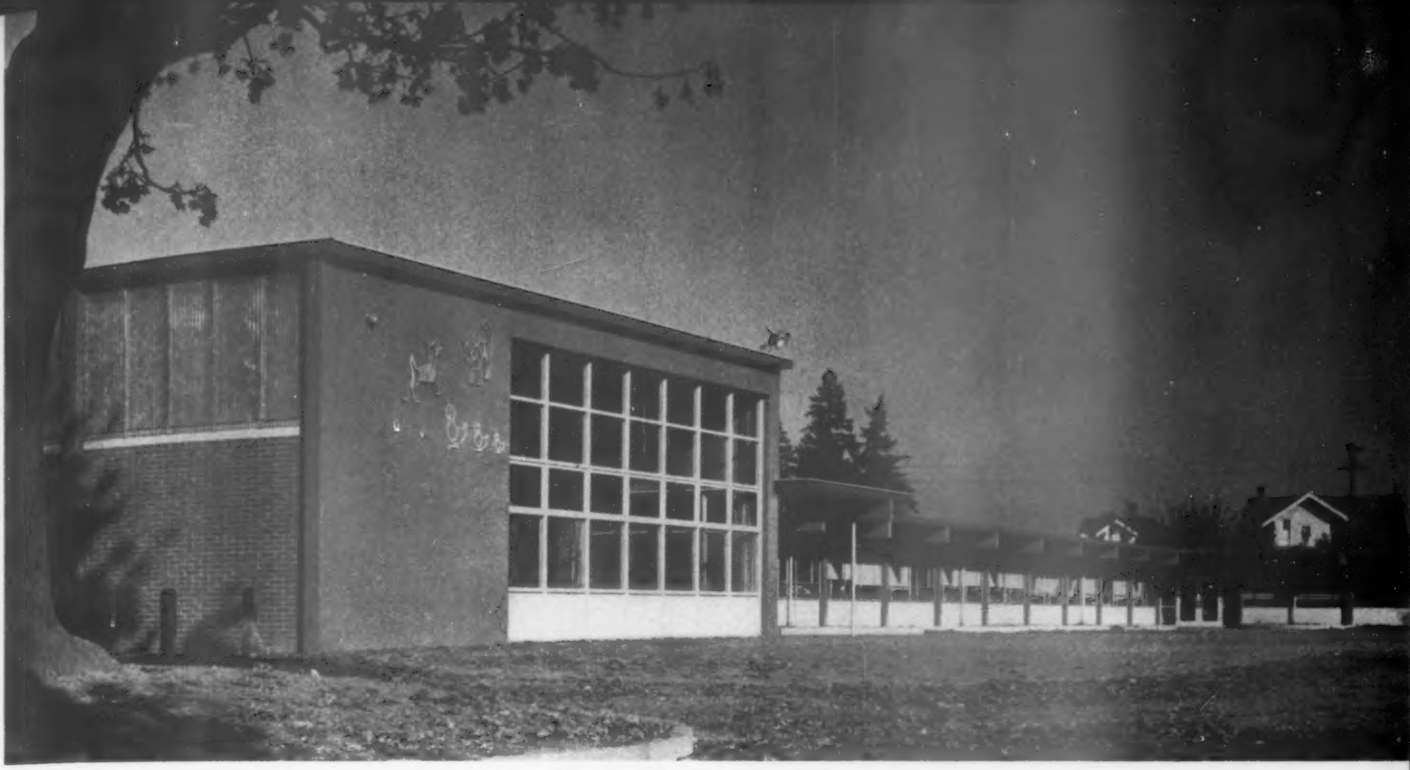
Office Practices

A 5-inch by 8-inch Kardex system for practically all department records is installed in the business office at the garage. This simplified system has made both current and permanent records more meaningful and much easier to keep. Cards are printed on the multigraph machine owned by the school system.

In order for the secretary of the department to keep the records of the department up-to-date and to do the large amount of figuring that the records require, an automatic calculating machine was purchased. This machine is an essential part of the office and is used to figure payroll, gasoline mileage, tire mileage costs and in making numerous budget calculations. With an electric typewriter, it saves the secretary a good deal of time.

Compiling the budget for the department is a considerable job. It is made somewhat easier with a system of accurate records on which to base the needs of the department. The budget is prepared by the supervisor and is submitted to the budget committee for approval. Thus far, the budget committee has made few changes in department recommendations. Each article included in the budget is set up as a separate item in the department bookkeeping system. Any time that money is spent for that item, it is deducted from the amount budgeted for it. Therefore, at any time, the exact amount remaining in this budget category can be determined.

This system enables the department generally to live within its budget. It has also enabled Fayette County to keep the transportation cost per pupil per year very low ($14.81 in 1954–1955) and still maintain reasonably adequate and safe transportation for an ever growing number of pupils.



The mural on the wall of the all-purpose room of the Sherman School is by the architect, Robert Billsbrough Price. It is executed in ½-inch and ¼-inch square iron bars. The outdoor area is a corner of the school's play yard.

BUILDING THE "ERECTOR SET" SCHOOL IN TACOMA, WASHINGTON

by ROBERT BILLSBROUGH PRICE

Architect, AIA, Tacoma, Washington

Mr. Price studied business administration at the College of Puget Sound, has a B.A. degree in architecture from the University of Washington and a master's degree in architecture from Massachusetts Institute of Technology. He served for four and one-half years in the USNR, Naval Air Corps, as a lieutenant, s.g. Mr. Price was president of the Tacoma Society of Architects for several years and is a corporate member of the A.I.A.

SHERMAN Elementary School in Tacoma, Washington, was designed for 600 students and meets the following area requirements: 18 classrooms, two kindergartens, a library and necessary related areas, a special service room, lunch-playroom with kitchen facilities, auditorium-playroom with a stage for assemblies and civic meetings, administration areas, teachers' room, storage and rest room facilities. The site of the new building already housed a three-story school constructed in 1897. The old building was not to be removed until the new structure was ready for occupancy.

With construction costs being a serious consideration and site size constituting a limitation, the Sherman School was designed as a double-loaded corridor scheme with bilateral lighting from a skylighted corridor. Entrances were provided for all avenues of approach, since the school is located at the hub of the neighborhood which it serves. Kindergarten children have a separate entranceway. Both all-purpose rooms can be isolated from the remainder of the building for evening and civic functions.

Western Washington has a relatively mild winter season with daily precipitation. Covered outdoor play areas and indoor play spaces were of prime importance for the new school. Both the lunchroom and the auditorium provide inside play area. The kindergarten court has a covered shed and a large covered area at the

A large display case in the lobby faces the main entrance of the building. The corridor leads to the combination auditorium-multipurpose room. Across the lobby is the library. The corridor, below right, has a skylight ceiling. The natural lighting is supplemented by incandescent fixtures.

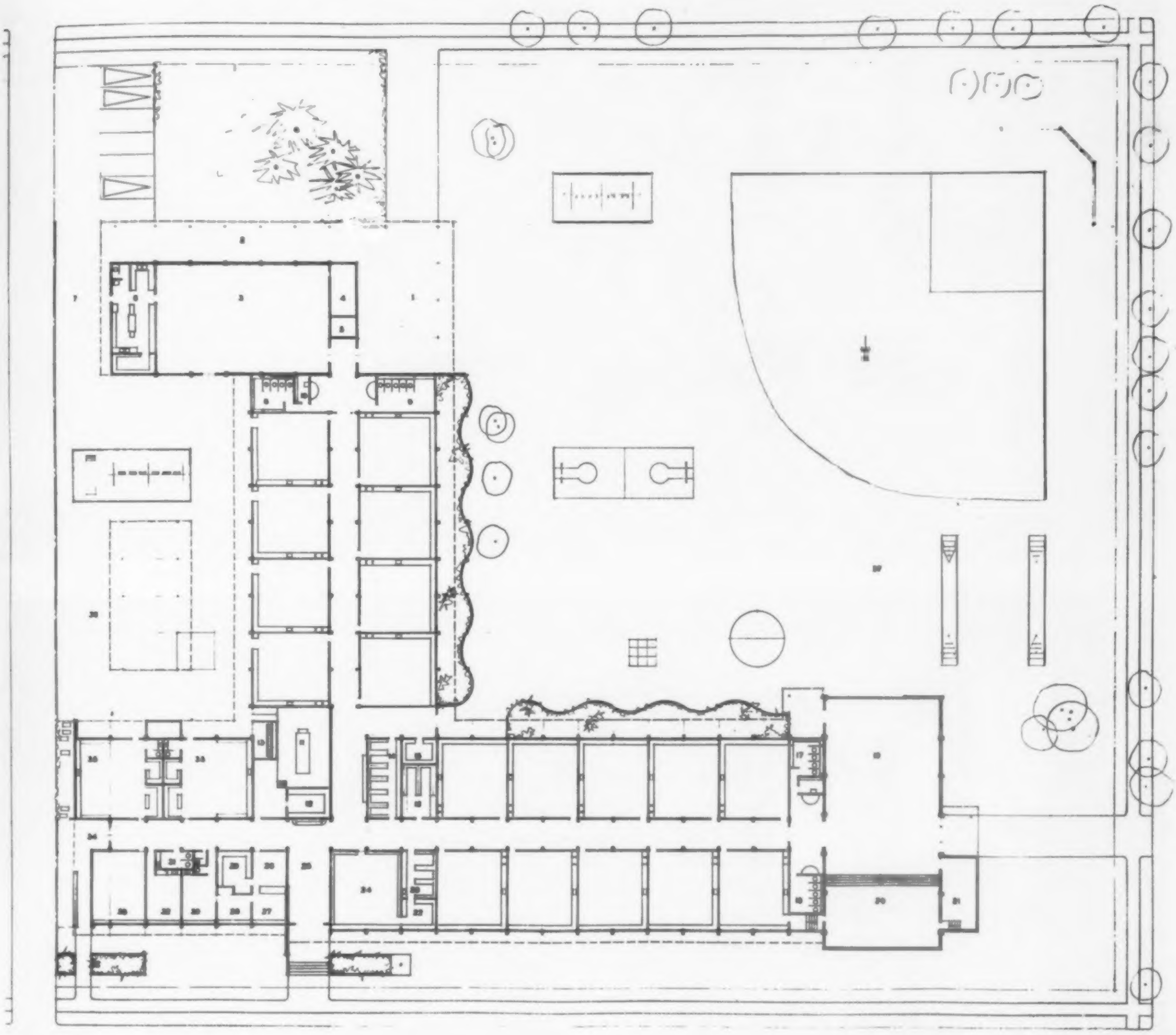
south end of the building fills the requirement for a sheltered outside play space.

The outdoor play area is divided into two general sections—the kindergarten-first grade play court and the southwest play space. Both areas receive the available sunlight during the entire school day and each outdoor play space is directly accessible from the indoor playrooms.

Sherman Elementary School is designed on a 14-foot, four-inch module bay. Classrooms are 28 feet, 8 inches by 33 feet, 10 inches. The module is the direct result of using to advantage stock materials, a maximum size of standard galvanized steel sash, a near maximum span for the three-inch acoustically treated steel roof deck and an economical bay spacing for prestressed concrete beams.

The "Erector Set" School

Virtually all parts of the Sherman School were specified as prefabricated or manufactured items, and



The divisions of the Sherman School are as follows: 1. covered play, 2. bike parking, 3. lunch-multi-purpose, 4. chair storage, 5. PTA storage, 6. kitchen, 7. service, 8. boys' w.c., 9. girls' w.c., 10. janitor's storage, 11. boiler room, 12. supplies, 13. transformer vault, 14. book storage, 15. patrol boy and playground equipment, 16. storage, 17. boys' w.c., 18. girls' w.c., 19. auditorium-multi-purpose, 20. stage, 21. chair storage, 22. library workroom, 23. stacks, 24. library, 25. lobby, 26. public, 27. general office, 28. principal, 29. workroom, 30. health, 31. rest rooms, 32. teachers' lounge, 33. special service, 34. kindergarten entrance, 35. kindergarten, 36. play court, 37. play area. The play fields and game courts for the older children are located away from the building.

the general contractor's job was that of an assembler. At the time the school was out for bids, it was referred to by the contractors as the "erector set" school.

The structural frame of the building has prestressed concrete beams, precast concrete columns and spandrels and a manufactured, long-span, acoustically treated steel roof deck. The beams are of prestressed concrete produced in a factory under exacting conditions. In lieu of conventional reinforcing bars, 5/16-inch high tensile steel strand cables, with an ultimate strength of 280,000 psi, were pulled initially on the lines to 200,000 psi strength.

The very high design working stress of 3,000 psi used in the prestressed concrete had no precedent in the United States and, in fact, was more than twice the maximum allowable working stress for concrete in the building code. The city of Tacoma building department permitted the higher working stress, but required a full scale load test, to destruction, of a prototype of each size beam used in the project. The guaranteed safety factor required was 2.5 times the design load. The actual factor of safety determined by the tests was 2.7.

Casting the Beams

All beams were cast in steel forms using 10,000-lb. compressive strength no-slump concrete. As concrete of this type is not plastic unless vigorously vibrated at frequencies of 6,000 to 7,000 cycles per minute, special vibrating equipment was developed by the Concrete Engineering Company, which made all precast and

The two kindergartens of the school are similar in room area and furnishings. The rooms open onto the play area for kindergarten and primary children.

This multi-purpose room has a stage and doubles as an auditorium. Chair storage is provided in a small room adjacent to the area.

prestressed units. This equipment was attached to the forms. The columns were precast using 6,000-lb. concrete and, again, steel forms and external vibration were used.

Conventional running footings were eliminated on all but the cast-in-place end walls. Instead of continuous footings, spot footings were used under the columns, with the precast spandrels resting on the spot footings and tying to the columns. The four-inch precast spandrel not only assumed the role of spandrel, but that of footing as well.

Flat bars were imbedded in the top face of the prestressed beams. Long-span steel roof decking, three inches deep, spans the 14-foot, 4-inch distance from bent to bent. Where it became necessary at the lobby to increase the span to 20 feet, the gauge of the 3-inch steel deck was simply increased. The acoustically treated roof deck forms the structural deck, is the finished ceiling, acts as a diaphragm for earthquake forces and was applied in a single operation.

The play shed was constructed of precast elements set on prestressed edge beams. Steel from the elements was welded to projecting steel from the edge beam and the void was grouted to a smooth finish.

Heating and Lighting

Sherman Elementary School is heated by a hot water system. There are convectors in the classrooms,

The back walls of the classrooms have natural cedar paneling. The counter covering is spatter vinyl. Built-in storage facilities accommodate all kinds of classroom material.

The window walls of the classrooms are sheltered from the direct sunlight by louvered overhangs. Classrooms measure 28 feet, 8 inches by 33 feet, 10 inches. The walls are stud partitions with plywood and natural cedar paneling.

The kindergarten-first grade play court receives all the available sunlight during the entire school day. This outdoor area is directly accessible from an indoor play space.

A covered area is provided for bicycle parking. From here the children may proceed directly to the covered playroom or to the outdoor play courts.

Dearborn-Massar Photos

while the kindergartens have radiant coils in the slab and unit ventilators. Administration areas are heated by convectors and the all-purpose rooms have a tempered and controlled hot air system, with tempering coils being heated from the hot water system. Lighting throughout the building is by incandescent and fluorescent fixtures and skylights.

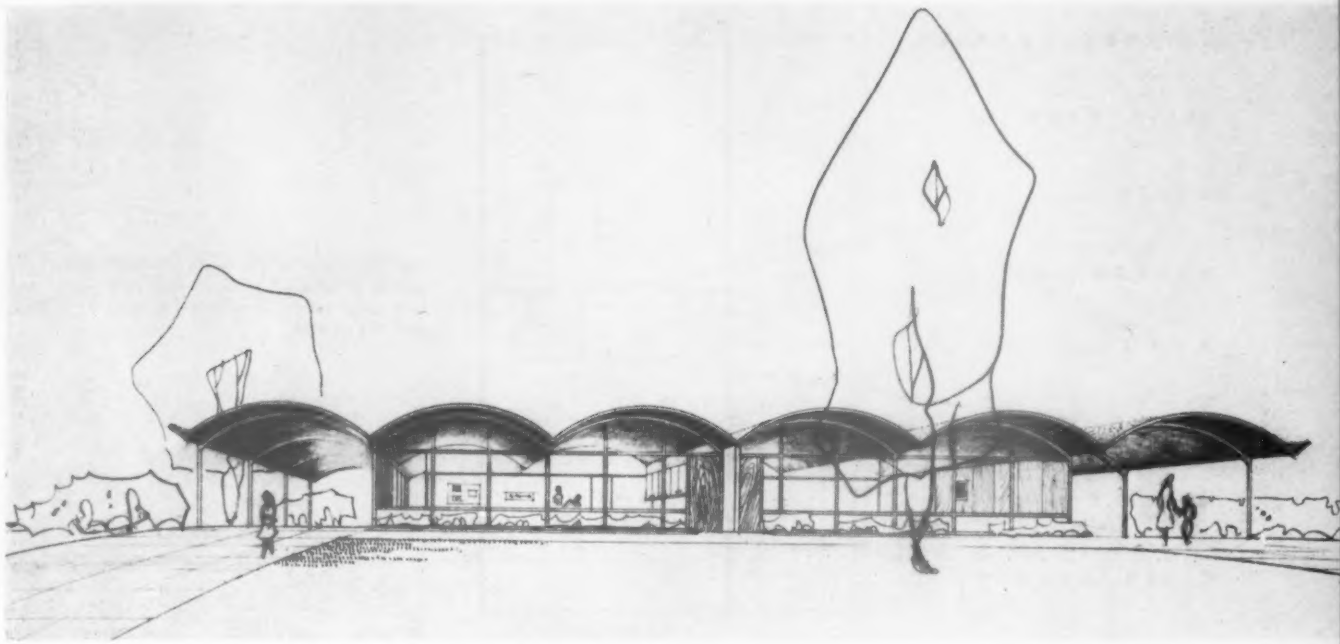
There is flooring of vinyl tile in the all-purpose rooms, corridor, kitchen and kindergartens. Classrooms and administration rooms have asphalt tile flooring. The classroom walls are stud partitions with plywood and natural cedar paneling. The corridor has a stud partition with an overlay of ⅝-inch sheetrock with sheet vinyl. Rest rooms have ceramic tile walls, quarry tile floors.

Cost Per Square Foot

Sherman Elementary School was built at a cost of $8.58 per square foot, exclusive of architects' fees. Amounts include all paving, shades, drapes, kitchen equipment and planting areas. The total area of the building is 47,949 square feet. This area is computed from the Washington State Department of Education formula: heated area, full; mechanical rooms, one-half; covered play area, one-half; covered walks, one-third. The total cost of the building was $411,753.

Alden H. Blankenship, superintendent of the Tacoma Public Schools, and James A. Hopkins, assistant superintendent, provided invaluable guidance throughout the entire building project and are largely responsible for its success. Their confidence in the architects' ability to adapt new structural concepts to school construction enabled the designers to develop a scheme which has blended a remarkable combination of utility and economy into a truly pleasing structure.

Worthen and Wing of Tacoma were the mechanical and electrical engineers for the project. Horace J. Whitacre and Associates were the structural engineers and Dr. Arthur Anderson was the consultant for the prestressed members. General contractor was the Ostruske-Murphy Company of Tacoma; the electrical contractor was the Ault Electric Company; and the mechanical contractor was F. C. Grosser and Company of Tacoma. The prestressed and precast structural units were made by the Concrete Engineering Company.



Transportable classrooms were designed by Eberle M. Smith Associates, Inc., for Dearborn, Michigan, to meet the needs of changing school enrollments.

DEARBORN, MICHIGAN'S TRANSPORTABLE CLASSROOM UNITS

by EBERLE M. SMITH

Eberle M. Smith Associates, Inc., Architects-Engineers, Detroit, Michigan

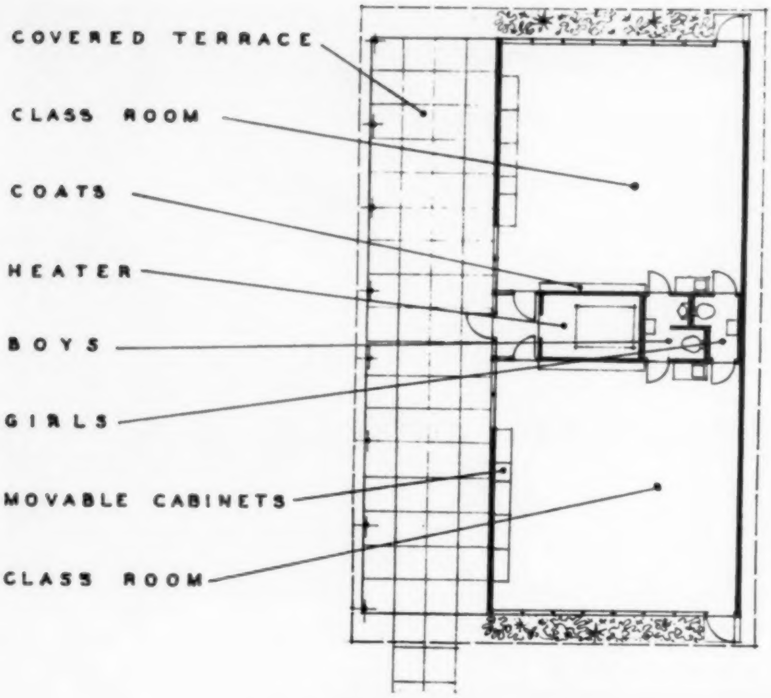
Mr. Smith graduated from the University of Michigan College of Architecture and Engineering in 1927. He gained experience in several Detroit architectural offices until 1935. In that year he entered private practice as a partner in the firm of Lyndon and Smith. Since 1942 the firm has been under Mr. Smith's name. The greatest part of the work of the firm has been in school design.

DEARBORN, Michigan's Board of Education was faced with what is today a familiar predicament: overcrowded schools. The standard solution for this problem is, of course, to build additional classrooms. However, in Dearborn's case, population trend surveys indicated that in certain areas of the city the crowding in the elementary schools would be only temporary.

This particular pattern of growth—swelling in first one area, then another—caused the Dearborn board to consider carefully the economics of building new classrooms. Was it wise to build a permanent structure that might in several years prove superfluous, while certain new subdivisions again experienced a critical shortage? Would it not be better to build transportable classroom units that could be relocated to meet the shifting tide of school enrollment?

After considerable study it was concluded that the most satisfactory answer to the problem of providing temporary teaching space is a two-classroom unit with its own toilets and heating system, which could be combined in clusters of two, four, six and eight rooms to meet variant needs. In Dearborn such a unit, 30 feet by 68 feet in size, was developed. Usually it is combined with an adjacent sheltered play porch. The units can be arranged in a variety of patterns to suit existing site layouts and can be connected to a building by a glassed-in passageway, if this seems desirable.

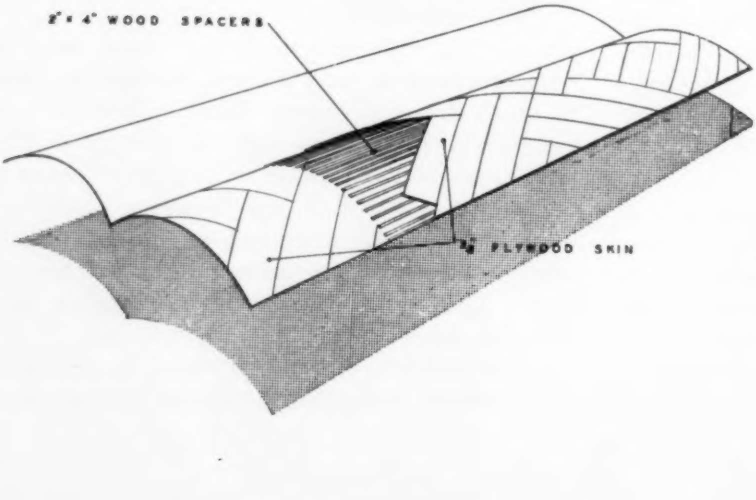
Because a major part of construction cost is the expensive labor of erection, the best answer for a trans-



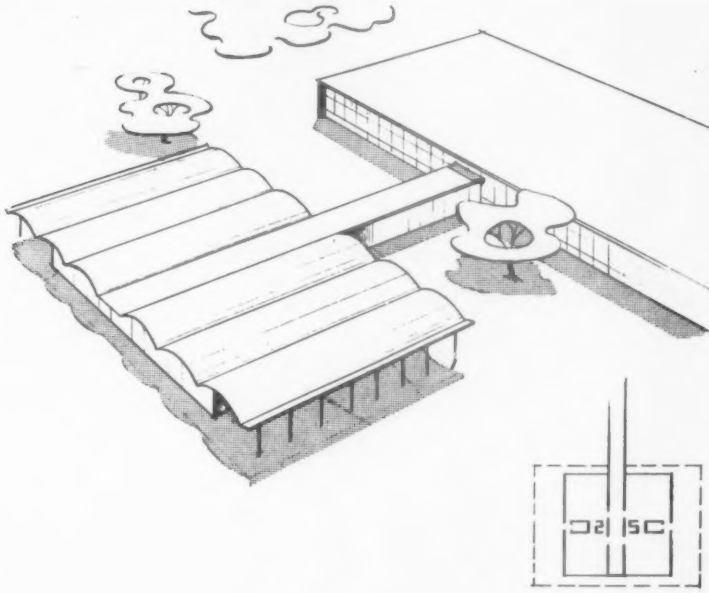
The basic unit of the transportable classroom includes a covered terrace, two classrooms, boys' and girls' toilets, movable cabinets, coat storage and the heater.

Lens-Art Photo

Each classroom of the transportable unit opens onto a covered play terrace.



The fifteen-foot span of each roof arch is composed of a double layer of 3/8-inch plywood. Each layer is separated by two by four spacers.



A double classroom unit, containing four classrooms, can be attached to an existing building when additional facilities are required.

portable school does not seem to be ease of demountability. A better solution is a unit so designed structurally that it can be relocated intact. At Dearborn, during the planning stage, several different structural schemes were investigated. The work of our office in thin shell concrete arched roofs had led us to making plywood scale models of proposed shells. These plywood models, which were intended for design study, were tested structurally with sand bags to determine deflection tendencies.

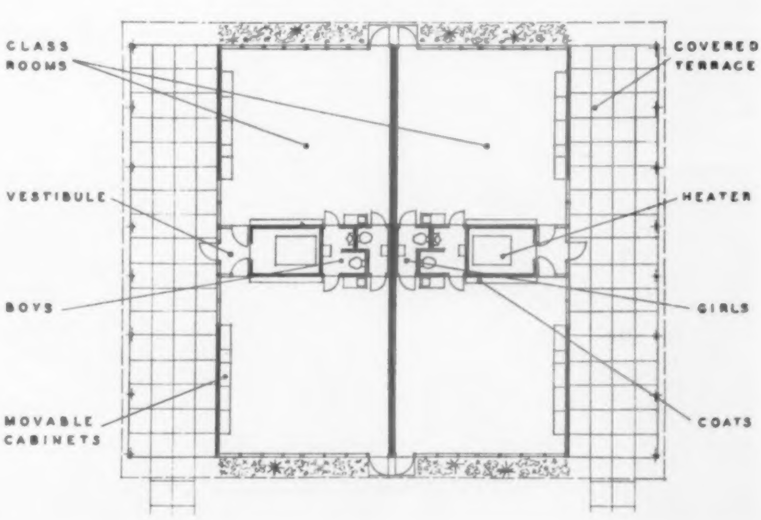
Arched Plywood Construction

So impressed were we with the strength, rigidity and possibilities of economy in arched plywood construction that this technique was adopted for the Dearborn transportable units. In this case the fifteen-foot span of each arch called for a double layer of $\frac{3}{8}$-inch plywood, with each layer separated by 2 by 4 spacers. This structural system is called a "stress-skin shell."

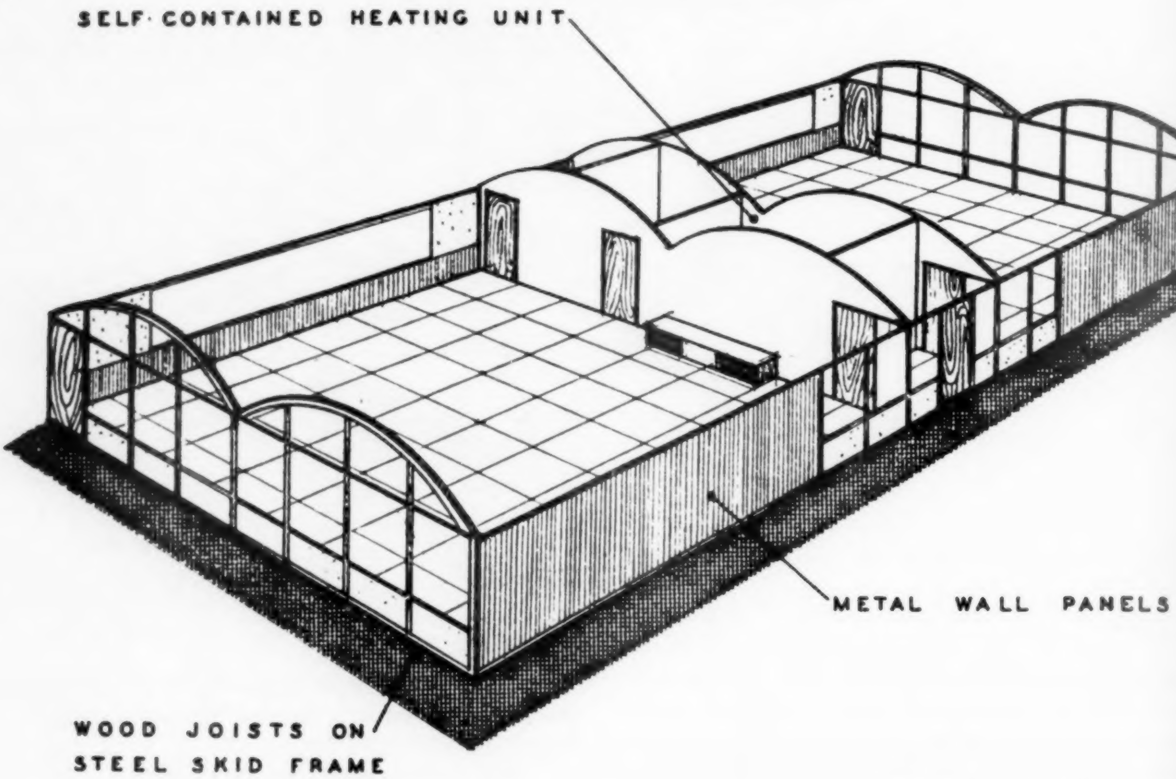
Moving Is One Operation

In order that the two-classroom unit can be moved in one operation, it is built atop a steel frame set down on expendable concrete block footings. The frame supports wood joists and a plywood subfloor. The interior surface of the outside walls between the steel pipe columns is comprised of prefabricated, insulated aluminum panels.

The interior walls around the utility core are two layers of asbestos millboard. The exterior walls are either ribbed aluminum siding or wood sash. The pipe columns support 5-inch by 5-inch arched laminated wood bents, over which are formed the two adjacent stress-skin shells. Acoustic tile covers the ceil-

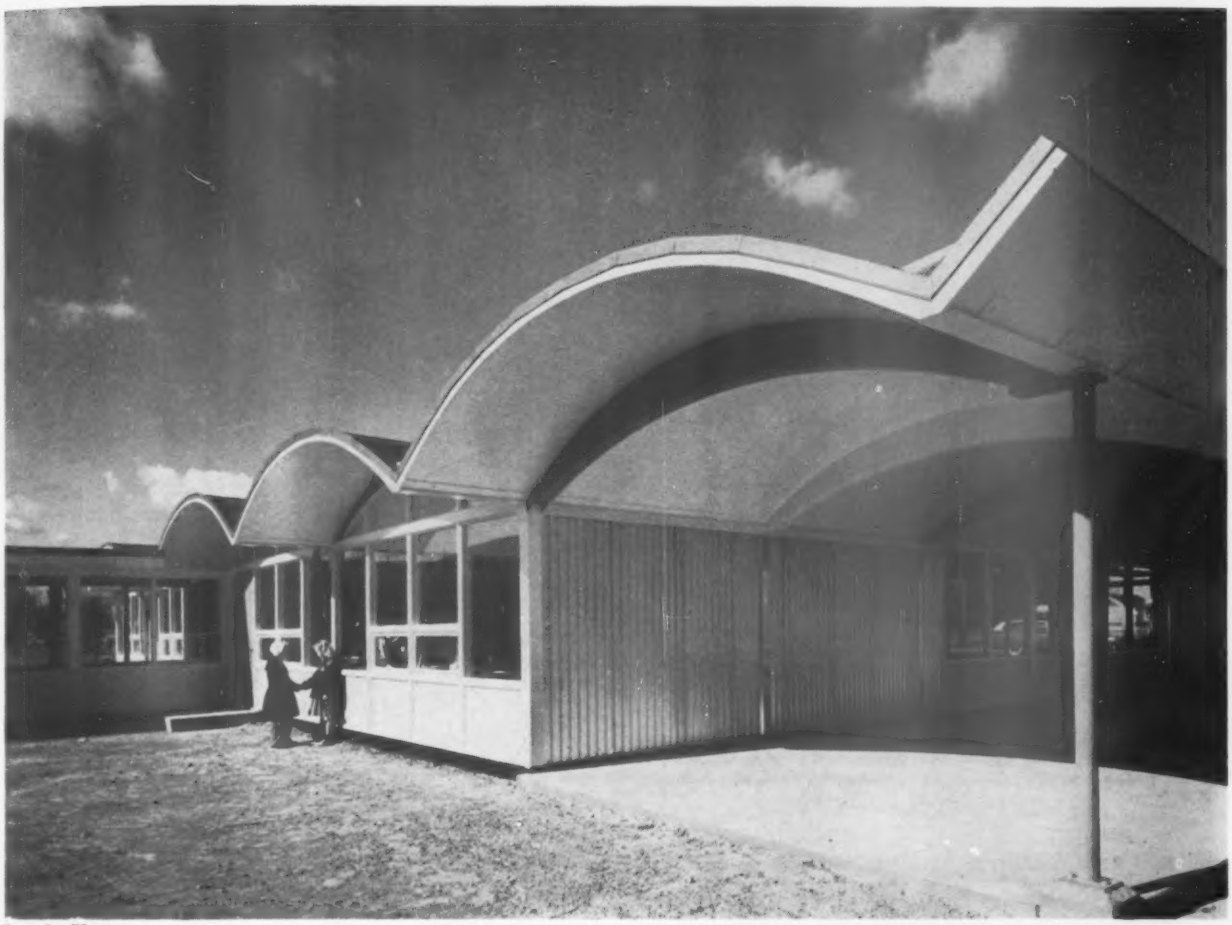


The double unit has back-to-back classrooms, with all service facilities located in an area which divides the rooms.



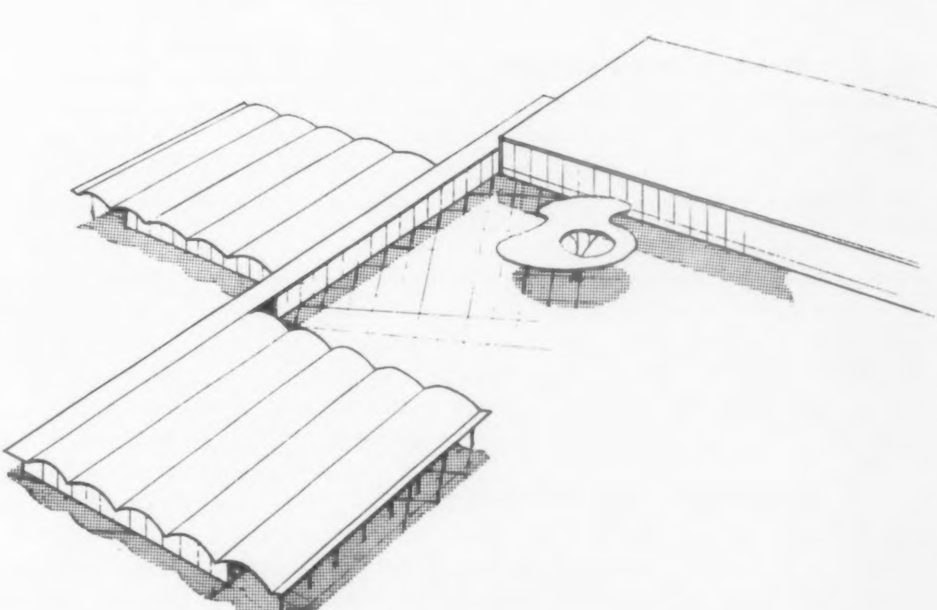
The transportable classroom unit is built on a steel frame which is set down on expendable concrete block footings. The frame supports wood joists and a plywood subfloor.

The classrooms are heated by oil-fired forced warm air furnaces through subfloor supply ducts to baseboard registers.

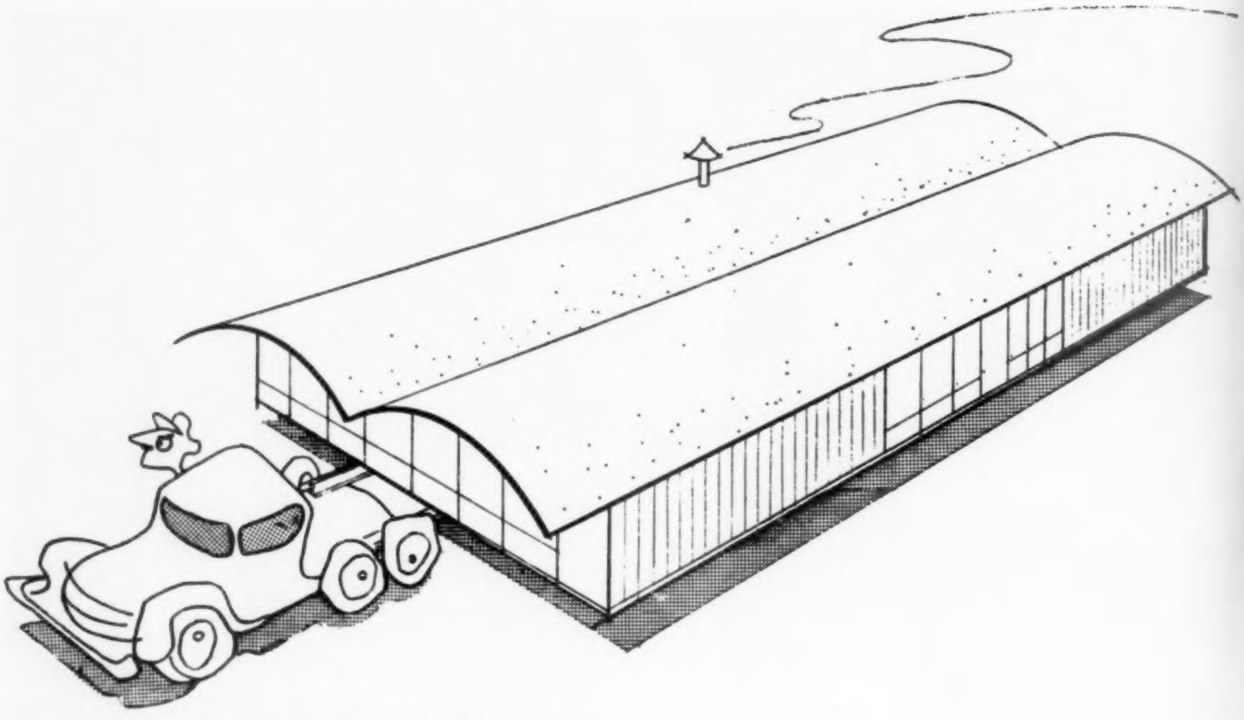


Lens-Art Photos

The exterior walls are either ribbed aluminum siding or wood sash. Pipe columns support 5-inch by 5-inch arched laminated wood bents, over which are formed the two adjacent stress-skin shells. The lighting within the units is by continuous fluorescent strip lights in suspended fixtures. Acoustic tile covers the ceilings and the shells are topped with insulation and composition roofing.



Clustered units of the transportable classrooms may be added to existing structures, and connected by open or closed passageways.



The units are relocated by disconnecting the utilities, removing the play porch roof, jacking up the steel frame and placing wood skids beneath it. The structure can then be towed away to its new location.

ings and the shells are topped with insulation and composition roofing.

Heating of these units is by oil-fired forced warm air furnaces through under-floor supply ducts to baseboard registers. Return air is through grilles in the utility core walls. There is natural ventilation in the classrooms, and there are ceiling exhaust fans in the toilet rooms. Lighting is by continuous strip fluorescent lights in suspended fixtures. The only other mechanical equipment is an electric hot water heater for each unit.

How to Relocate the Units

To relocate one of these units the utilities are first disconnected, then the play porch roof is removed by truck trailer. Next the steel base frame is jacked up, wood skids are slid in beneath it, and the entire structure is wheeled away. The area of a typical two-classroom unit is 2,040 square feet and the volume is 18,500 cubic feet. The average cost to date for each unit, exclusive of covered porches and connecting corridors, has been $34,680. Because the setting up of the jig on which the plywood shells are formed is a sizable expense and need only be done once, it is believed that considerable economy could be achieved in the fabrication of additional units.

So far, population shifts have not been such that the Dearborn Board of Education has elected to relocate any of these units, and so precise information on the cost of moving is not yet available. It is anticipated, however, that when the time comes to relocate these units, they will prove an adaptable and economical answer to the vicissitudes of today's school population.

Hedrich-Blessing

The administration department of the Libertyville, Illinois, High School has a comfortable waiting area. The school was designed by Childs & Smith of Chicago.

ADMINISTRATIVE AREAS FOR SCHOOL BUILDINGS

by FRANK A. CHILDS

Partner, Childs & Smith, Architects and Engineers, Chicago, Illinois

and W. J. SMITH

Partner, Childs & Smith, Architects and Engineers, Chicago, Illinois

Frank A. Childs attended Armour Institute of Technology and also studied in Paris. W. J. Smith is a graduate of the University of Pennsylvania and attended the Beaux Arts Institute, Paris. Both men are fellows of the American Institute of Architects. The firm of Childs and Smith was established in Chicago in 1912. The practice is both specialized and general. The firm has designed elementary and secondary schools, college buildings, campus layouts and dormitories, among its educational buildings.

BASIC considerations in the planning of a new school building are the location and area allotments of the administrative area. The requirements of such an area will necessarily differ from situation to situation and will depend on the size of the district the school is to serve, the student enrollment and the administrative and office personnel involved.

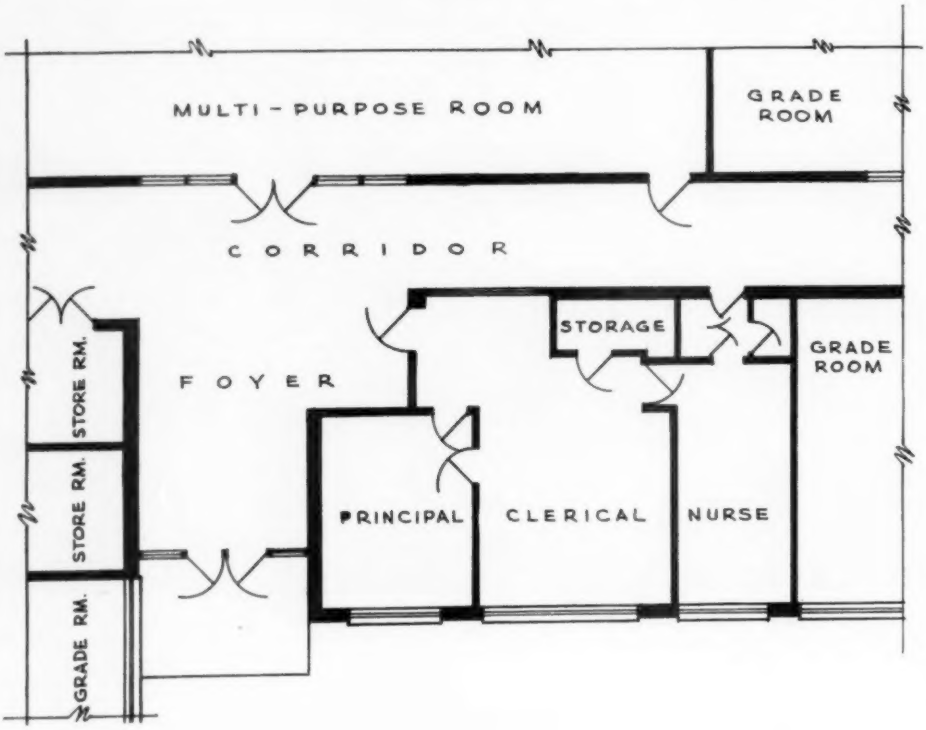
An administrative area may range from a unit which includes offices for the principal, an assistant, a secretary or clerk and a modest waiting room to a unit which may involve spaces for health, dental hygiene, guidance, boys' and girls' deans, clerks, secretaries, offices for the superintendent, principal and supervisors, conference rooms and general and private waiting rooms with foyers and corridor area included.

The administrative services of a school, whether it be a small elementary school or a large comprehensive junior-senior high school, must be housed comfortably in an area easily accessible from all parts of the school, itself, and yet available to the general public.

A campus plan may provide a separate building for administration in a central location with convenient roadways and covered walkways leading to it, and parking areas nearby. Teachers, students, personnel and the public will easily find their way to this building.

Taylor Park Elementary School

In most school buildings the administrative area is located near the main entranceway. It can usually be seen immediately upon entering the building. In the Taylor Park Elementary School in Freeport, Illinois,



Just beyond the foyer of the Taylor Park Elementary School in Freeport, Illinois, are offices for the principal, clerical staff and school nurse. The architects are Childs & Smith.

the administrative area adjoins the main foyer which also leads to the large multi-use unit.

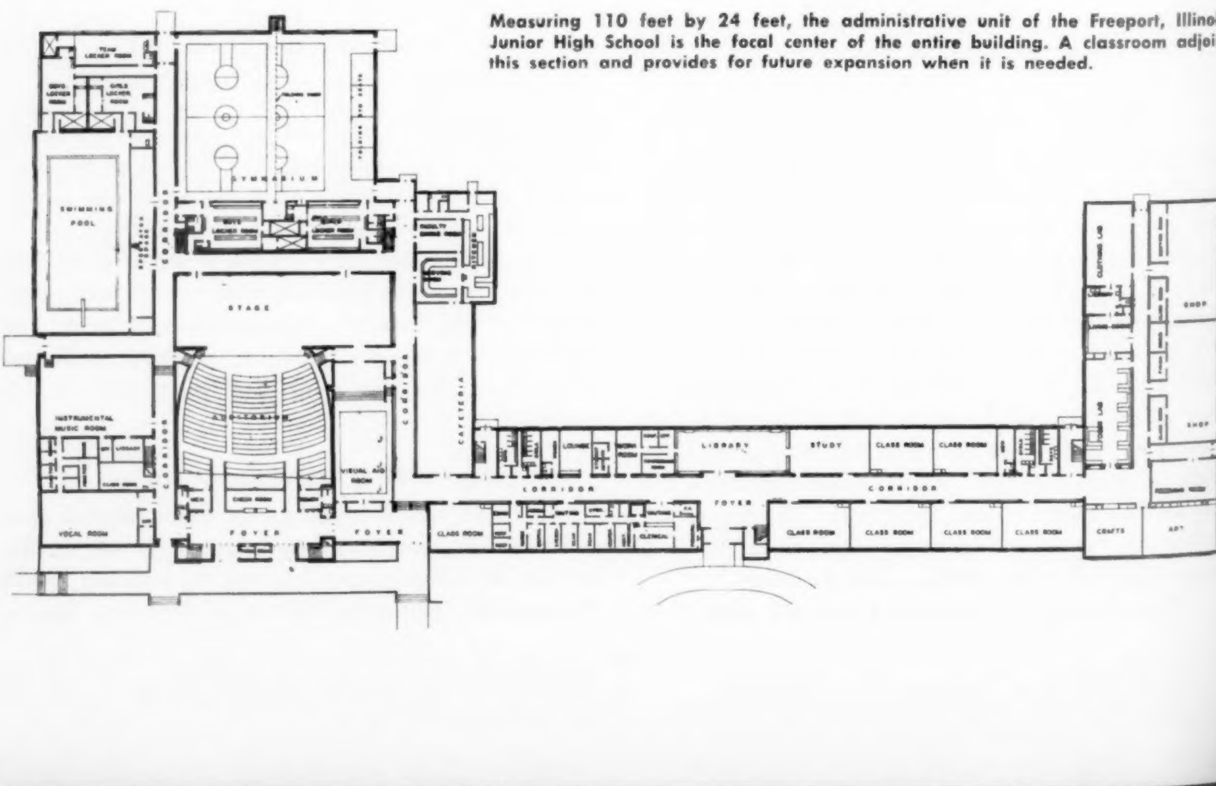
All features of this area have been planned to suit the size of the elementary school age youngsters attending the Taylor Park School. There is a low counter or desk between the waiting area and the clerical space with its long work and display counter. The waiting room also serves the principal's office and the nurse's room and is a compact space with a congenial atmosphere.

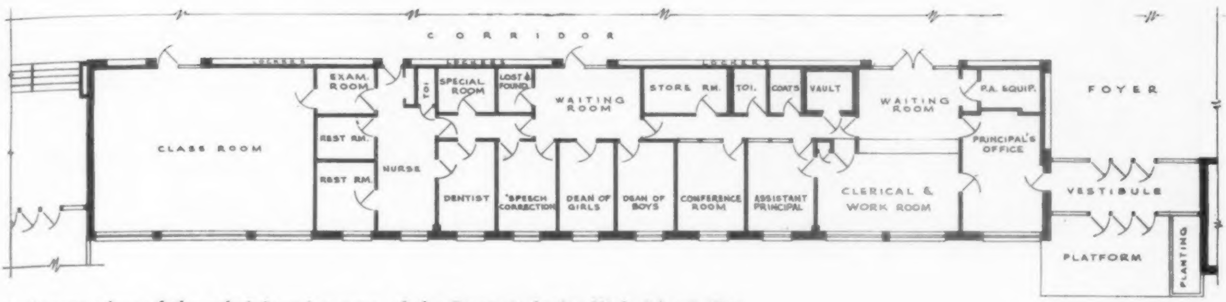
The wallpaper and draperies of the office area preclude a forbidding appearance and help to maintain an informal and homey aspect which will not frighten children or intimidate visitors. The entire section includes the principal's office, space for the clerical staff, the nurse's room, a storage room and the waiting room.

Junior High School in Freeport

The Freeport, Illinois, Junior High School was completed in 1952. It accommodates 900 pupils, including the seventh, eighth and ninth grades, and is one of the most complete schools of its kind in the

Measuring 110 feet by 24 feet, the administrative unit of the Freeport, Illinois, Junior High School is the focal center of the entire building. A classroom adjoins this section and provides for future expansion when it is needed.





A close-up view of the administrative area of the Freeport Junior High School. This unit has two waiting rooms, staff offices, medical rooms, a conference room and ample areas for storage, the lost and found and the public address system.

state. It has an auditorium and swimming pool in addition to all the usual departments of junior high school curriculum.

The administrative unit of the school measures 110 feet by 24 feet and is adjacent to the main entrance foyer, forming the focal center of the entire school plan. Together with the library and study hall, including the well appointed leisure reading area, reference and committee rooms, social and general faculty lounge, the unit presents a very pleasant appearance to anyone entering the building.

The administrative section is continuous, with all departments intercommunicating. These include spaces for the superintendent, assistant superintendent, two deans, the conference room, two waiting rooms, nurse, examination and two rest rooms, dentist, speech correction, lost and found, commodious store rooms, the vault and toilet. A public address system is located next to the general waiting area and the superintendent's office for independent use as required. A classroom area adjoins the office section and will provide space for future expansion when needed.

There is a general faculty lounge across the corridor, complete with rest rooms, toilet and coat room, which is also used for receptions and entertaining visitors to the school. The library has a central browsing nook, looking out upon a landscaped lawn and the play fields beyond.

The Hinsdale High School Offices

The Hinsdale, Illinois, High School houses 1,000 students. In compliance with Illinois law and tax disbursements, the school system operates on a dual system, but unifies its two sections and programs by electing the same members for the high school and the elementary system. While this arrangement of provid-

A special feature in the high school for Hinsdale, Illinois, is the large community-faculty-board room which faces the lobby. The room is furnished with comfortable and pleasing chairs and sofas. The floor is carpeted with a broadloom rug.


Hedrich-Blessing

Rooms for the administrative staff of the Hinsdale, Illinois, High School occupy both sides of the corridor. Spaces include room for the superintendent of schools and his clerical staff, and a room, also used for community activities, for school board meetings. There are eight counselors' offices adjoined by waiting rooms and a conference room. Architects of the school are Childs and Smith.

ing superintendent's and principal's offices in the same building may be questioned, it does ensure many economies and a unified school program and system.

The grade school offices, located on one side of the spacious lobby, include the superintendent's office, toilet and filing alcove, exit to the main lobby and the clerical office. A workroom is separated by a low counter from the outer office, and has a vault, two closets and a room for large group tests. The store room is near the stairway and has twenty file cabinets.

Across the lobby are the principal's office, clerical office and waiting room, storage areas, a workroom, vault, counselors' offices with waiting rooms and a conference room. On the other side of the corridor are located the nurse's office, dispensary, waiting room, home nursing classroom, men's and women's lounges, toilets, storage rooms, kitchen, community-faculty board room and a small library.

The community-faculty board room measures 22 feet by 32 feet and is directly across from the main lobby. It provides a welcoming area for all visitors. The room is furnished with comfortable davenports, arm and lounge chairs, a decorative breakfront cabinet and circular and incidental tables. Two drop-leaf tables may be placed together for board meetings. A broadloom carpet adds a pleasant note to the area. There is a special louver panel ceiling fixture directly above the tables, and floor and table lamps complete the lighting arrangement for the room.

The lobby leading to the community room has a flexachrome tile floor with warm flexwood walls.

Wide Variation Possible

The three administrative areas described above illustrate the wide variation possible in the amount and types of facilities provided in a school building for carrying out administrative services. No area of this kind should be planned and designed without consulting the administrative staff members and personnel who will use the spaces and facilities.

Particular attention should be given to the main foyer and waiting room which will give a visitor his first impression of the interior of the school building. The children in the building should be remembered also, and the area planned so that it will not awe them as a forbidding and mysterious section of the school.

The administrative area of the school, if planned correctly, will be the focal point of school facilities and activities, truly the "heart" of the school artery system.

NEIGHBORHOOD SCHOOLS IN NEW YORK STATE

by BASIL L. HICK

Associate, Division of School Buildings and Grounds, The State Education Department, Albany, New York

Mr. Hick holds B.A. and M.A. degrees from Syracuse University. He served with the U.S. Army for four and one-half years, two and one-half of them in Europe. He has been with the New York State Education Department, Buildings and Grounds Division, since 1950. Mr. Hick has completed graduate courses beyond the master's level at Syracuse University and Cornell University.

THE idea of a neighborhood school is one which is receiving much attention lately, and this attention merely proves the old saying that "history repeats itself."

The following is quoted from the New York State Laws of 1795: "It shall be lawful for inhabitants residing in the different parts of any town to associate together for the purpose of procuring good and sufficient schoolmasters and for erecting or maintaining schools, in such and so many parts of the town where they may reside as shall be most convenient.

". . . nothing herein contained shall be considered to prevent the inhabitants residing near the limits or borders of any town from associating with the inhabitants residing in any adjoining town for the above mentioned purposes."

In the New York State Laws of the year 1812, which is generally considered the date of the initiation of the Common School District in New York State, the following is quoted: ". . . that the Commissioners are hereby authorized and empowered to divide their respective towns into suitable and convenient number of districts for keeping their schools and to alter and regulate the same from time to time as there may be occasion: and wherever it may be necessary and convenient to form a district out of two or more adjoining towns."

Of course, there are many differences between the neighborhood school of that time and of today. Much

The typical neighborhood school of years ago provided education for children in grades one through eight. The schoolhouse was usually a one room building on a small plot of land.

of this difference is caused by the change in the neighborhood. Quite often each old-time school served about the same number of students. Today, population densities are such that many more students are served by each school.

The neighborhood school of yesteryear provided education for children in grades one through eight. This education consisted primarily of the three R's. The counterpart of today usually enrolls children in grades K-6, sometimes K-3. The program consists of the three R's and then some. Another marked difference is the fact that the modern neighborhood school is part of a system which takes care of the total school life of a child.

The facilities of the neighborhood school of the past consisted quite often of only a single room. Sometimes this shared a quarter acre plot with a wood shed and a "Chick Sale" special. These various buildings were used during a shorter school year and the adult use of them was usually limited to the annual school meeting.

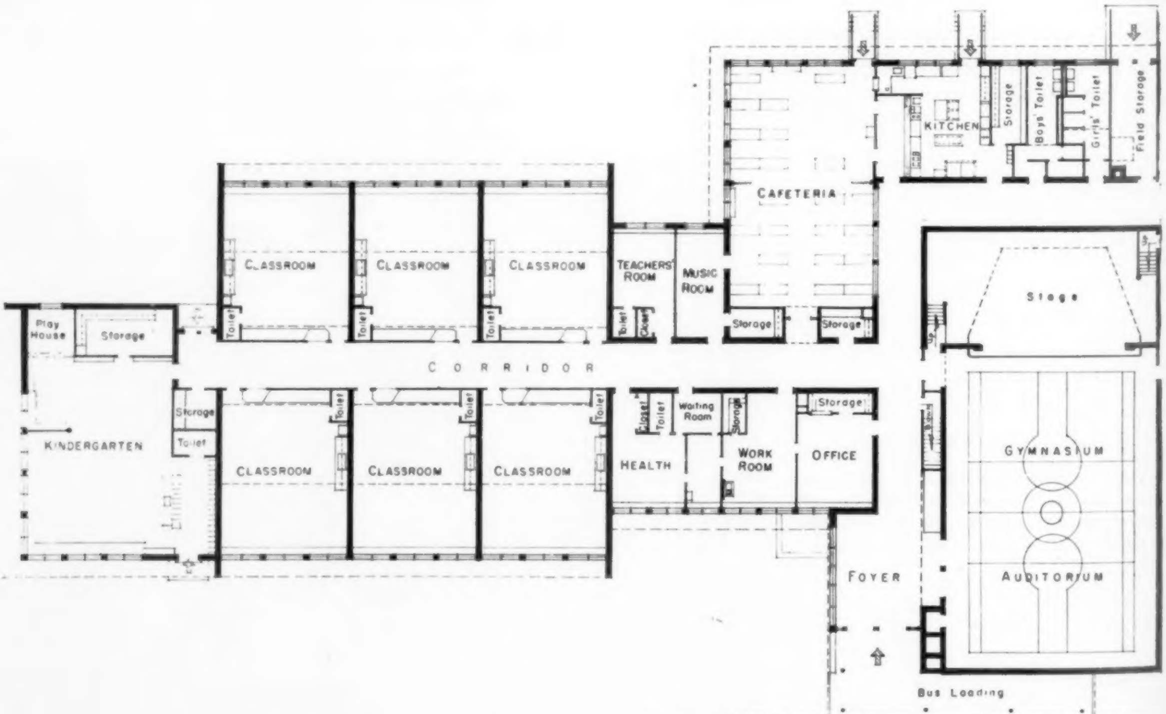
Today's Site Is Larger

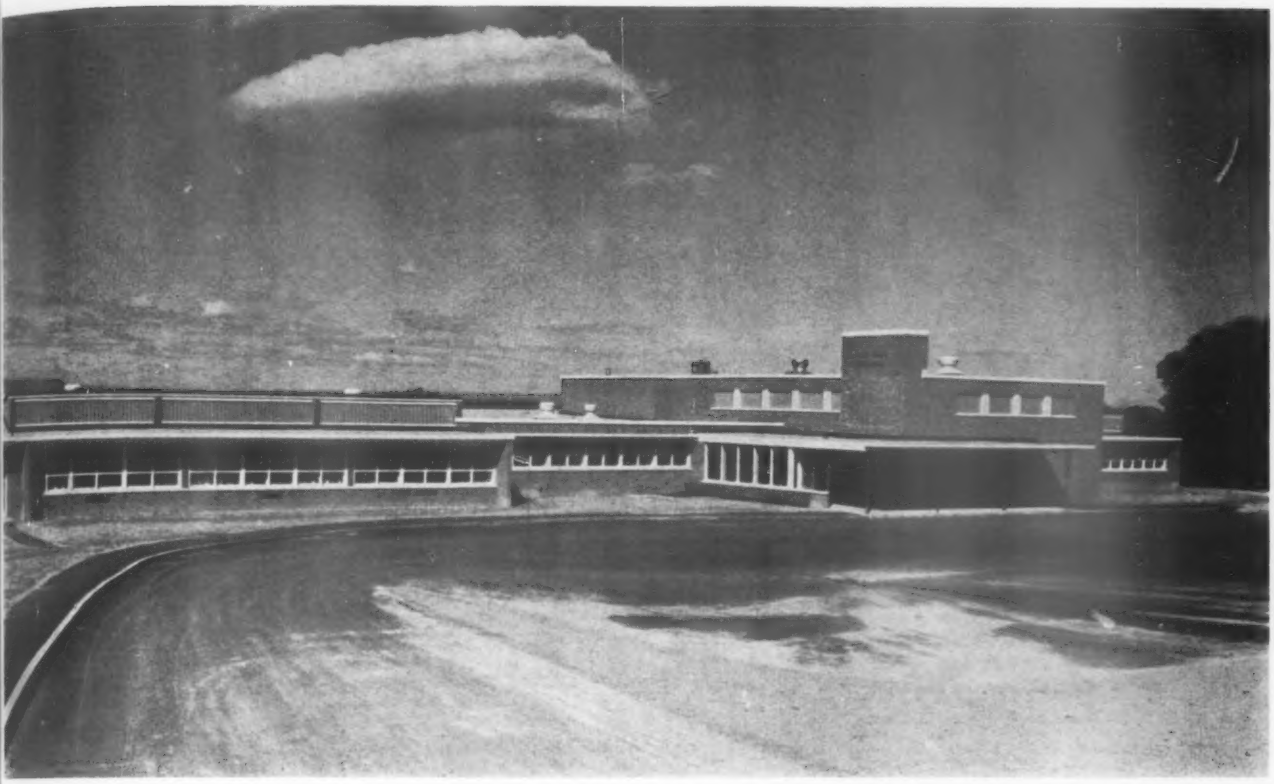
Today's neighborhood school is situated, for the most part, on an adequate site (10 to 15 acres) which is used not only in the day to day school program but also in the after school and summer programs of various civic groups in the immediate vicinity. The building itself is, in many districts, truly a community school and a neighborhood school. Various adult education classes are held at night; recreational programs for adults and teen-agers in the immediate vicinity are also accommodated and civic meetings as well.

It would be unthinkable today to build an ele-

A neighborhood school of today is the Red Mill School in the East Greenbush Central School District, New York. The architects are W. Parker Dodge and Associates.

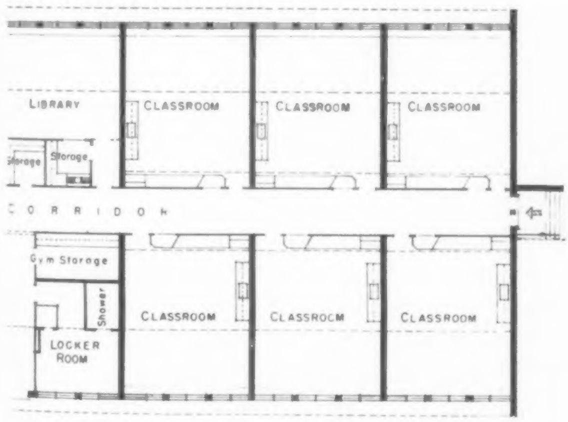
J. P. McNally





mentary school without providing a playroom so that the children can participate in a physical education program regardless of the weather.

Health facilities, an office for administration and space for teachers are essential parts of all elementary buildings. The amount of space for these items varies depending upon the size of the neighborhood served.



The Red Mill School has a large kindergarten with its own separate entranceway and toilet. Adjacent are six primary rooms, each with its own toilet. The administrative area is approached through the main foyer of the building. It consists of a general office, a waiting room, workroom, the health suite and a teachers' room. The cafeteria is next to the music room. Folding doors can divide the cafeteria space into two separate rooms. The large kitchen has its own storage space and loading dock. The gymnasium also doubles as an auditorium and there is a large stage provided. Next to the gymnasium-auditorium are the gym storage room, locker room and shower room. A field storage room is across the corridor and has its separate entrance from the outdoors. The library is situated near the six classrooms for the older children.

With or Without Lunchrooms

The vast majority of schools provide a place for the children to eat a well balanced meal in pleasant surroundings where they have an opportunity to learn how to eat properly. Now and then, a community will plan its building so that the neighborhood school will be within easy walking distance of all the pupils served, and the dining room and kitchen are omitted.

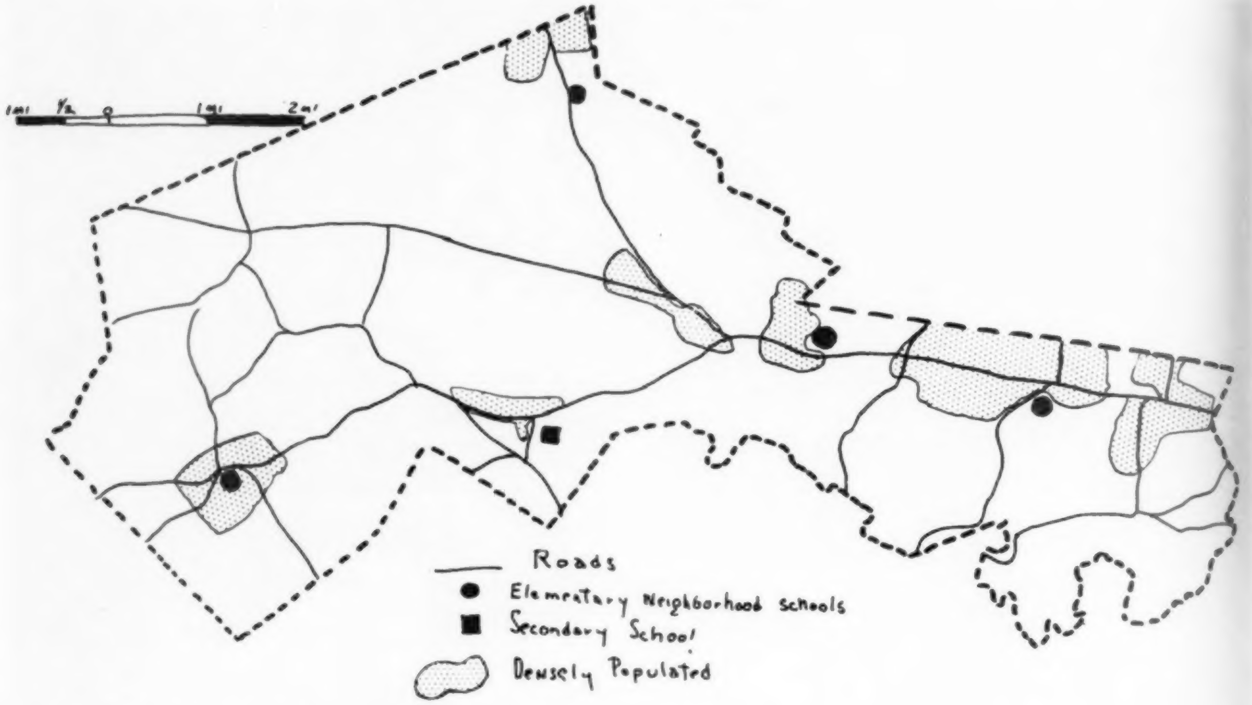
An area in the school where the student body can meet as a whole or in small groups is a definite part of today's building.

The Early School Districts

In the early stages of district reorganization in New York State many school districts were formed which are considered small by today's standards—small that is, from a pupil population viewpoint. In these cases it was felt that the entire school population in any district could adequately be housed under a single roof without in any way affecting the educational qualities of the program.

Today's Districts Are Larger

With the advent of larger school districts and larger numbers of pupils it was thought desirable to limit the number of pupils that would be housed within any one building. It was also considered better to limit



A typical school district may have as many as four elementary neighborhood schools. These will be located in or near the densely populated sections of the district. The secondary school, which accepts children from each neighborhood school, has a central position, easily approached from the major population centers of the entire district.

the age range within any one building. As a result, many of our central districts as well as union free, village and city school districts have established schools in neighborhoods. Generally, in addition to the items which have been listed previously these schools are limited to a maximum number of students and house elementary school age children from a definite geographical area.

How Districts Are Organized

The accompanying map is an example of only one of many central districts in the state that are operating neighborhood elementary schools. These schools feed into one central secondary school. In this typical example the neighborhood school site is used as a summer recreation area for the community or small town in which the building is located. The school buildings are also used for the adult education program carried on by the central school district.

Neighborhood schools accommodate a minimum of about 200 youngsters and a maximum of 600. If more facilities are necessary it generally is deemed advisable to establish another neighborhood school. If fewer than 200 pupils are available, they may be transported to a larger unit. However, it has been the established practice in many districts to establish a neighborhood school once the number of pupils to be served can justify such a plant.

Merrill Tinsley

Groups of primary children discover that it is fun to visit the library at the Darwin Elementary School in Chicago where books and furniture have been especially selected for them.

SCHOOL LIBRARY QUARTERS IN CHICAGO

by MARY F. McMANUS

Consultant for School Libraries, Board of Education, Chicago, Illinois

Miss McManus has a degree in library science from Rosary College and a master's degree in history from DePaul University. She has also completed graduate work in education at DePaul University and Chicago Teachers College. She has taught high school English and was an assistant librarian in Chicago high schools. From 1943 to 1950 Miss McManus was head librarian at Foreman and Austin High Schools. In 1950 she received her appointment as supervisor of high school libraries for the city of Chicago.

RENDERING good library service to *all* children in the Chicago Public Schools from kindergarten through junior college is the keynote of our library program. In achieving this goal some compromises with established standards have had to be met. In library quarters, particularly, we do not have ideal situations in all of our school buildings.

Most of our elementary schools were built in an era before a centralized library was considered an essential part of the physical plant. High schools were built with libraries that proved to be inadequate to meet the demands of the changing curriculum. Junior colleges have been housed in buildings not originally designed for college classes.

In no case, however, have the original building inadequacies proved an insurmountable obstacle. We are not completely satisfied with what we have achieved but are happy, today, to have the school architects consult the librarians whenever they plan library quarters for new buildings. In the older buildings, however, necessity continues to be the mother of our inventiveness.

It is not my purpose to give a complete, or even a comprehensive picture of where our inventiveness has led us. Rather I hope to tell the story of how we have dealt with certain physical inadequacies to achieve attractive and functional library quarters. The libraries dealt with here have been among a number which have proved to be an inspiration in carrying out the task of constant improvement in our library services.

The team that has worked together to create better library quarters in Chicago has been made up of the school building principals; Mrs. Dilla W. MacBean, director of the division of libraries; the four library supervisors; the school architects; and an understanding and cooperative group of school administrators.

Some Pertinent Statistics

To set the scene for the reader a few pertinent statistics are given. Chicago has 400 schools. There are 351 elementary schools, with centralized libraries in 345 of them. Overcrowded classroom conditions and the proximity to a branch of the public library have made it unfeasible at the present time to press for centralized libraries in the remaining six schools.

A few years ago there were many more schools

Special cabinets or containers are used to house special materials, making them easy to reach and convenient for use as teaching aids and student projects. These cabinets are at Wright Junior College.

The school library can reflect all phases of the curriculum. For the remedial reading program at Wright Junior College the library has special books and reading accelerators.

Tables are rearranged to create a study area for a special subject or class project. Books, flat prints and individual slide viewers are combined to give students the information they seek.

which had no centralized libraries. However, as the values of the library program have become more and more evident, every effort has been made to provide some sort of quarters. The ends of corridors have been used to house a book collection, or a large cloakroom is converted into a small library. In fact no possibility has been overlooked. We do not feel that it will be long before even these six buildings will have their own library rooms.

Among the elementary schools 235 have the services of a full-time trained librarian. One hundred and ten smaller schools share the services of a librarian. There are 38 regular high schools and 7 vocational high schools, each with its own library. These schools are staffed by 82 librarians and 54 school library clerks. Three junior colleges are staffed with 12 librarians and 14 clerks.

At Wright Junior College

What has been done at Wright Junior College, one of the three city junior colleges, shows how much can be accomplished through improvisation. In a building originally designed as a junior high school, the library was assigned quarters in what had been a small gymnasium. Undaunted, the library staff under the direction of C. Lawrence Lynn has achieved a workable

Nathan Ginsberg Photos

plan of service with one of the most functional audio-visual centers in the city.

Using movable bookshelves and drapes, areas have been set up for reference materials, reserve books, bound periodicals (now being replaced by microfilm and microfilm readers) and audio-visual materials, including listening and viewing areas for these materials. To compensate for the lack of conference rooms one side of the large reading area has been designated as a study section where students may work together. The other side of the room is for silent study by individuals.

The Impact of Good Service

If you were to ask Wright students or members of the faculty for an evaluation of their library, the inadequacy of the physical quarters would perhaps be overlooked in the reply. The achievement in service rendered in the library is so tremendous that it is only the library staff who realize how much more efficiently

At Wright Junior College students use microfilm machines to carry out their assignments. Though crowded situations may result, the school library can provide almost any kind of equipment.

and effectively they could perform in a more adequate physical plant. This is evidence of the impact of good service.

Truly a Materials Center

Students and teachers at Wright regard the library as truly a materials center. Recordings, tapes, reading accelerators, viewers for slides and filmstrips are available for student use right in the library. Students of the drama may listen to an outstanding actor reading the play they are studying, while next to them might be students listening to a symphony. Across the room other students may be working up speed in shorthand through dictation from a tape. Foreign language students are frequent and enthusiastic users of recordings and tapes.

Wright Junior College does not have an ideal listening area, but it does have one. It is hoped that we will see similar areas being set up in our high schools and elementary schools. Wright has shown that, given the equipment, a listening section can be arranged in the library without interfering with the regular program.

Conferring on New Libraries

Inspired by Wright's achievement, we welcomed the opportunity to confer with the architects who were designing the newest secondary school building now under construction in Chicago. Dunbar is a vocational high school being built on Chicago's south side. Plans for the library are a definite step forward in making the library a materials and service center.

In evaluating our secondary school library quarters we have been keenly aware of the need for an area closely connected to the reading room where a teacher may bring an entire class group to use library materials for work on a special topic or unit. Teachers like to isolate their own class group from the other students

Shorthand is improved with hours of additional practice time at the library where commercial discs and tapes, as well as school produced material, are in constant use.

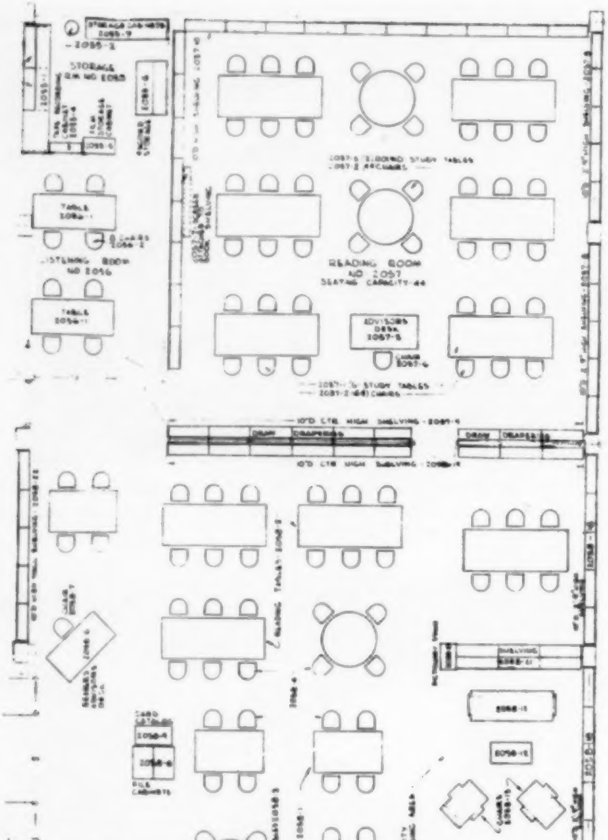
Listening stations will allow as many as six students to listen with earphones to a single recording to supplement reading assignments.

in the library. The librarians like to be able to identify the class group so that they may work more closely with the teacher in seeing that his class finds the materials needed.

Projects for Older Schools

In planning rehabilitation projects for older schools we have attempted to set aside such an area. The idea has been enthusiastically received. In the plans for the new Dunbar Vocational High School an area large enough to seat a class group, which would be a part of the reading room but at the same time separated from it, was set up. When not in use by a class, curtains may be drawn and a teacher may preview a film or filmstrip for future assignment. Other times, with drapes open, students may study in the room or in the main reading room.

A small conference room is also provided in the Dunbar Vocational High School. This room may be used as a periodical reference room with back issues of



The library area at the Dunbar Vocational School includes a separate reading room which will accommodate a class group, a small conference room, a workroom, a listening area with turntables and earphones and a storage room for audio-visual materials and some equipment. This school is under construction and will have an enrollment of 2,000 students. The architects are John C. Christensen of the Chicago Board of Education and the associate architects are Hollabird & Root & Burgee. The large reading room is divided into sections by the use of shelving and draw draperies.

magazines stored on its shelves. A combination workroom and librarians' office adjoins the conference room. Both rooms have glass partitions above counter-height shelving, separating them from the reading room. It was felt that a larger workroom would be more effective than breaking the area into an office and a workroom.

Centralized Catalogs

With centralized cataloging for our high school libraries and a clerical assistant, the librarians in the Chicago schools have been relieved of much of the routine work formerly carried on in their offices. Good library service in a high school library depends in large measure on the ready availability of the librarian. In our planning, therefore, a librarian's or teacher's desk is placed in a strategic part of the room.

At Dunbar a truly new advancement in planning is made. A listening area is included in addition to a storage area for recordings, tapes, filmstrips, films and some equipment. The classroom area of the library, like all classrooms in the building, is provided with a roll-away screen. Sufficient and strategically placed electrical outlets are also provided.

Compromising on Shelving

To provide enough shelving a compromise regarding stacks had to be made. We do not advocate high stacks extending out into the room because of the difficulties of supervision in the alcoves created by these stacks. However, at Dunbar we agreed to having low counter-height stacks extending out into the room from the windows. Two of the areas thus created have provided us with excellent browsing areas which will be furnished with colorful upholstered furniture.

The importance of browsing areas to brighten up libraries in some of our older buildings has been well

Lindblom High School students are enjoying their new browsing center, provided for them through the cooperation of the PTA.

Merrill Tinsley

A special browsing area has been set up in a portion of one of the two libraries at DuSable High School. This section has become a literature reading center and is increasing the appeal of the literature library at the school.

Merrill Tinsley Photos

demonstrated in Chicago. Through the cooperation of the PTA, Lindblom High School now has a colorful browsing center which has proved to be quite popular with the boys and girls. This has been the latest accomplishment in sparking up one of our older school libraries. Colorful, light golden yellow draperies, blue-green walls and new fluorescent lighting have all combined to make the library an inviting, cheerful room.

The ingenuity of the library staff, the clever use of student art work, the lining of high inaccessible top shelves with wallpaper, and ever-changing and colorful displays have also added to the general attractiveness of the room. Working with older buildings, we have realized more and more the importance of doing

A busy center for student and teacher activities is the newly developed social science library at the Steinmetz High School in Chicago. The room is made attractive with draperies and light furniture.

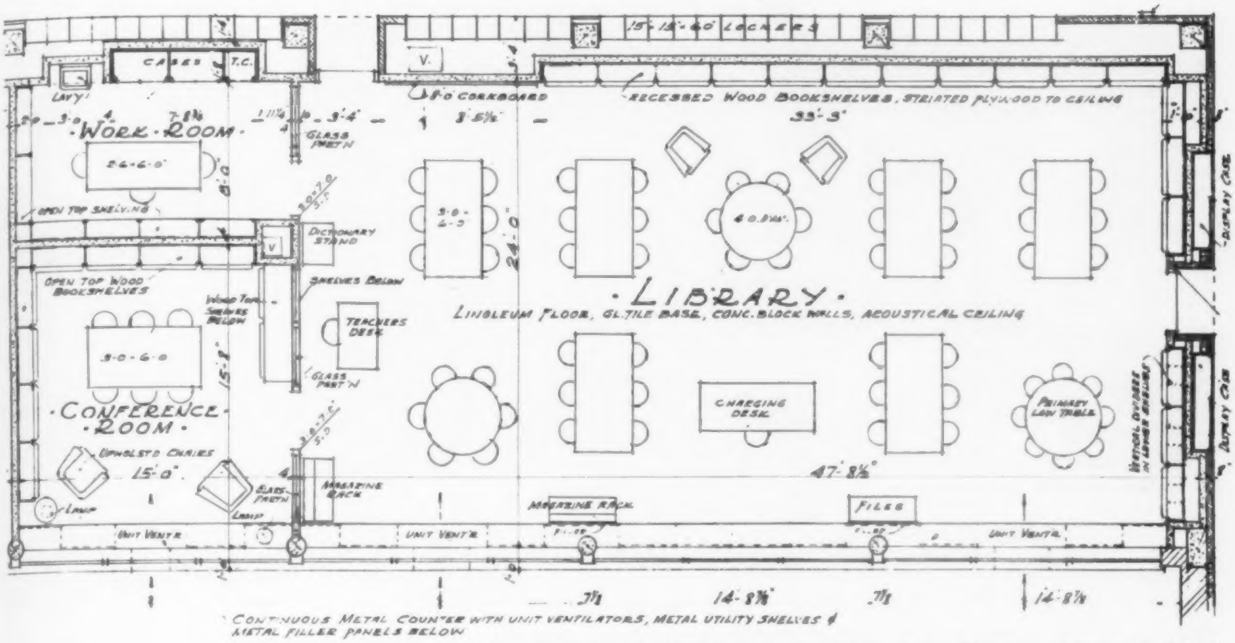
The original library room (above) at Steinmetz High School proved to be inadequate for the program. A double classroom was converted into a social science library (left).

everything possible to improve the attractiveness of the room. Paint, draperies and furniture can do much.

At DuSable High School a new browsing area was set up in a portion of one of the two libraries. At this school we were presented with the problem of multiple libraries. In a number of our high schools the original rooms set aside for library purposes were found to be inadequate. It has not always been possible to enlarge the original room. Thus, the idea of creating a second library room developed.

At DuSable this second room is directly across the corridor from the original library. It has slowly taken shape as a literature reading center, housing the literature section of the library, the fiction books and a section of books especially selected for remedial reading class groups. In the beginning only the literature and remedial books were housed here behind glass-doored bookshelves. The room was used at different periods for various activities not related to the library.

However, as the English teachers saw the possibilities for creating a special library, the program grew. This year the doors have been removed from the



One of the latest plans for an elementary school library in Chicago is that of the Carpenter School. This school will replace one of the older elementary school buildings in the city. The architect is John C. Christensen of the Board of Education. There will be a separate workroom, a conference room and a primary corner.

bookshelves and new shelving was added. Fiction books are located in an attractive browsing area. The room is used full-time for library purposes.

It must be conceded that it was difficult for the library staff to operate at top efficiency as the room and the program were developing. Now, though, they can see the program steadily enlarging with a new and growing interest in it on the part of the teachers and the students. This willingness to "make do" for the moment has led to the development of many attractive and functional rooms in both the elementary and secondary schools.

Multiple Libraries

A multiple library scheme which has attracted a great deal of interest is the one developed at Steinmetz High School. Here, a second room was set up as a social science library. The original library, one of the most attractive in the city, proved to be too small to house either the student body or the collection. A double classroom, down the hall from the library but separated by a stair well, was converted into the second library.

Starting out with desks still in the room and social studies classes scheduled for many periods in the day, the room has now become a most attractive library. Desks were removed, new floor covering was installed, an acoustical ceiling and fluorescent lighting were added. Additional shelving was installed and blonde tables and chairs added the final touch. It took almost four years to accomplish this, but through it all the school's library program was developing. The library staff's willingness to put up with difficult physical conditions while maintaining and increasing the scope of the program, created an interest on the part of the principal and teachers which helped to bring about the final result.

The above are examples of some of the changes made in a few of our secondary school libraries in Chicago. As one school achieves success in changing the physical conditions of its building, word spreads to others, and a constant program of redevelopment and rehabilitation is carried on. Because of the bigness of the Chicago school system some of the changes may take time, but a willingness to accept small changes as part of the ultimate improvement has brought great success in achieving better physical conditions for the school libraries.

And in the Elementary Schools

Probably the most inspiring part of the Chicago story of creating and improving library quarters may be found in the elementary schools. Through the leadership of Mrs. Dilla W. MacBean, a definite planned program for library quarters in the elementary schools has been established. Shortly after she came to the Board of Education in 1935 to organize a library for the central offices, she was given the added task of sponsoring a WPA project for school library clerks. These clerks were to work under supervision in preparing books in the schools for library usage. Finding little to remotely resemble libraries in the then 333 elementary schools, Mrs. MacBean set about the task of organizing centralized libraries in each school building.

Merrill Tinsley Photos

The library room at the Ogden Elementary School was the product of careful planning and architectural design.

It has taken twenty years to fulfill this goal, but each year sees greater and greater progress. Part of the story is, of course, the recruitment of qualified personnel. Mrs. MacBean started with a few teachers in the schools, training them in some of the basic techniques of library science. The in-service program has grown into a graduate program of studies in which candidates may earn a master's degree in library science from Chicago Teachers College. However, this training program and the actual library program, as it is carried on in the elementary schools, are stories in themselves. It is with the school library quarters that we must concern ourselves here.

From Classroom to Library

Mrs. MacBean developed a list of minimum equipment necessary to transform a classroom into a library. From very small beginnings attractive functional libraries have grown. It was sometimes necessary to use a large cloakroom, the end of a corridor or a basement room. As the program developed, principals, teachers and parents from the schools demanded better library facilities. Mrs. MacBean was always there to make helpful recommendations. The library supervisors made numerous visits to the schools, helping to plan and organize new and rehabilitated rooms.

All New Schools Have Libraries

Since the war years many elementary schools have been constructed in Chicago. All of them have had, as part of the original architectural plans, a room set aside as a centralized library. In the smaller schools a single classroom was used. In larger buildings a classroom and a half were given over to the library and included a workroom area and a small conference room. The latest plans for an elementary school library in Chicago show a tremendous development in the twenty years since a library program became an integral part of the curriculum.

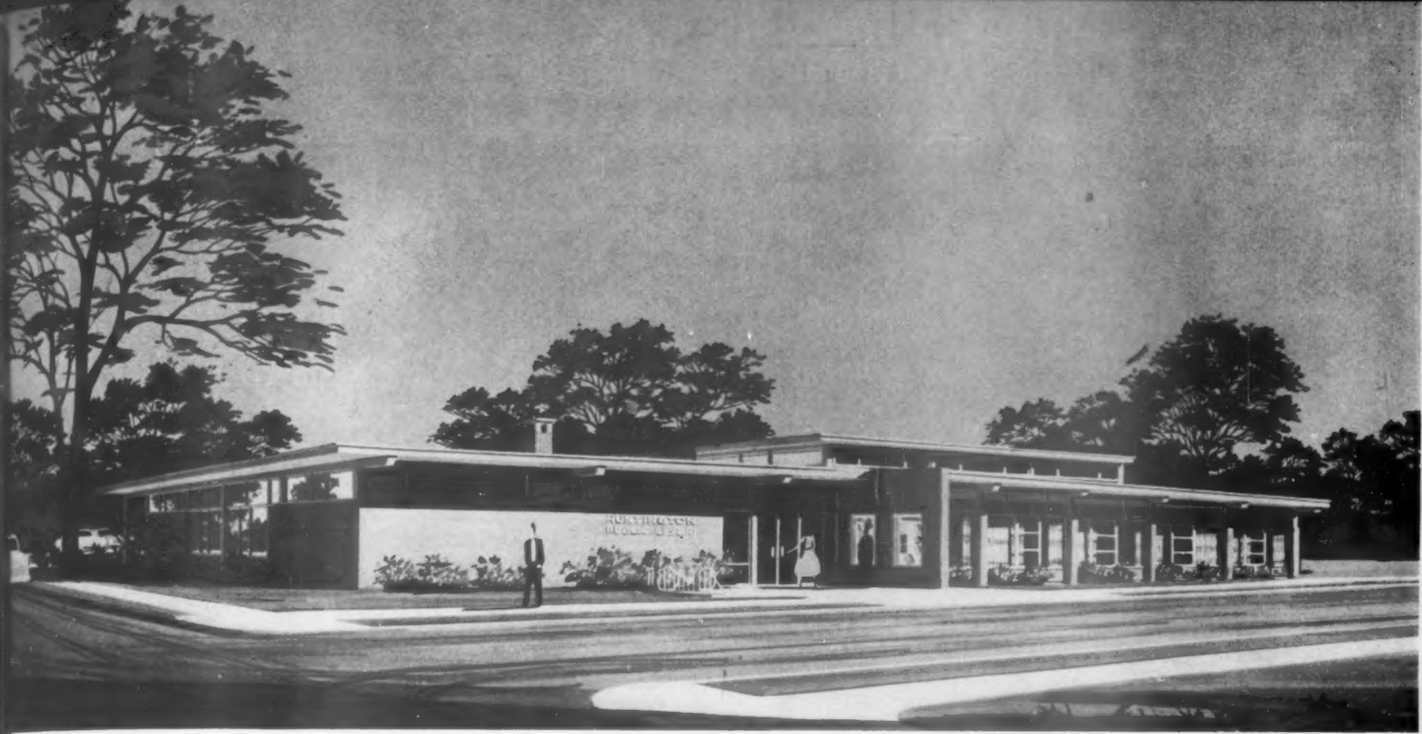
The Ogden Elementary School is one of the new elementary schools in which a library was included in the architectural planning. Not all elementary libraries are as attractively furnished and designed as this one. However, even in some of the older buildings, paint, floor covering, drapes, blonde tables and chairs, and standard shelving have transformed drab rooms into inviting, colorful libraries. The true keynote is that every school *can* have a library. The beginnings may be small, the progress slow, but the goal is worth working toward.

Originally planned to serve students from the fourth grade up, the Chicago library program now reaches down to the kindergarten and primary level. Whenever possible, a special primary corner has been set up. The small youngsters enjoy visiting the library for their weekly library period. Such interest cannot help but establish the need for a corner especially for them. It is an excellent place for the librarian to gather these beginning readers around her for a story.

A Motto of Progress

The City of Chicago has had a motto of "I will." We who have worked in and with the school libraries in Chicago have adopted this motto in spirit. *We will* have a centralized library program in every school in the city. *We will* serve all the children attending our schools from kindergarten through junior college. *We will* accept the inconveniences of poor facilities in the beginning, because we have seen our dreams fulfilled.

No obstacle is insurmountable. Given the librarians and the funds for books, *we will* carry on a library program not fit for a king, but for the fine boys and girls attending the Chicago Public Schools.



A new public library building is now being planned for the community at Huntington, Long Island, New York. An outdoor display wall is designed to attract potential users to the library.

PLANNING AND FINANCING SUBURBAN PUBLIC LIBRARIES

by KENNETH GIBBONS

AIA, Gibbons & Heidtmann, Architects, New York City

Mr. Gibbons is a graduate of the Yale University School of Architecture. He also completed undergraduate work at Lafayette College. In 1945 he formed a partnership with William Heidtmann for the general practice of architecture. Prior to this Mr. Gibbons had spent seven years in responsible charge of specific building projects while associated with two New York City architectural firms. His firm's library work is widely known.

THE primary problem in planning and financing suburban public libraries is of direct concern to all school people. As a tax-supported institution, the library, like the school, is dependent on the amount of money the voters are willing to pay for its services. This amount is not much. The history of the public library is one of an undercapitalized plant manned by an underpaid staff.

This situation is not the result of public hostility. The public generally accepts self-education as an ideal, the reading of books as cultural advancement and the public library as an instrument to this end. Special studies show that no library has opposition to what it is doing. But with like unanimity, no one wants to pay too much for library services. This situation has been worsened today by the greatly increased demands of the school for the local tax dollar.

The basic problem, however, is one of public apathy toward the library. Growing communities need, and in most cases are obtaining, new schools. They also need, and in most cases are not obtaining, new libraries.

Schools and libraries have much in common, but on the local political scene the two tend, directly or indirectly, to compete for the tax dollar. This deplorable situation borders on the ridiculous when it is realized that today the library receives from 1 to 2 percent of the local tax dollar, and the school receives from 25 to 50 percent.

Much can be written on library services to individuals, to business and industry and to other com-

Ben Schnall

A striking feature of the new public library at Manhasset, New York, is the butterfly roof. The roof enables the interior spaces to obtain spaciousness and light. There are high windows on four sides of the library, and light from them is deflected downward.

munity organizations. However, our concern here is with the relationship of the public library to the school, and the recognition of the contribution the library makes to public education.

While the public library must be considered a part of the overall educational system it is, for the most part, an unappreciated junior partner. The library board and the Friends of the Library are in no wise equal in political power to the elective school board and the PTA.

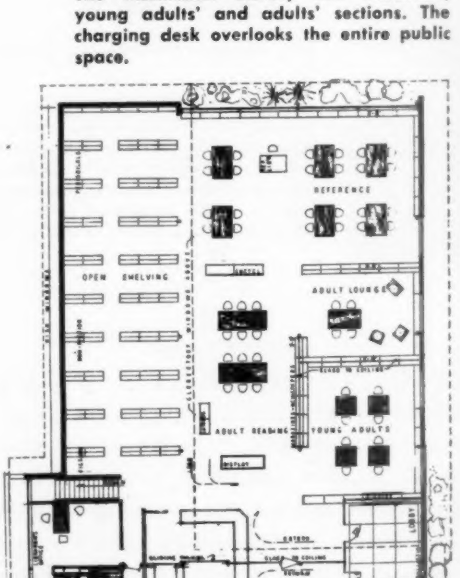
Increasing Use of the Library

With the rapid extension of high school and college education in the present generation, the use of the public library by students has had a corresponding increase. By far the greatest users of public libraries today are children of school age. Only about 30 percent of the adult population use the library at all, but approximately 50 percent of the children of school age are regular users. Much of this usage is for school work. Therefore, a considerable portion of the library's small portion of the tax dollar indirectly reverts back to the school.

The main area of service by the public library to the school is twofold. First is the direct service to the student by the library in preparing assigned school work. Second is cooperation with the school library in furnishing and maintaining a book collection in the school library.

Concerning the relationship between the school and the public library, it should be recognized that the school library is not, nor is it intended to be, a substitute for the public library. Even the most complete school library service must be supplemented by the public library. This fact is exemplified by surveys which show that the better the school library, the greater the use by students of the public library.

The Manhasset Library has children's, young adults' and adults' sections. The charging desk overlooks the entire public space.



In view of these services it is in the interest of the public school for the school administration to support the public library. By support is meant here not a direct monetary contribution, such as the contract for service to the school library, rather it is meant that the school administration should take an active part on the local political scene in the library's behalf, and should assist in overcoming public ignorance of and indifference toward the library.

Other problems concerning libraries are more directly concerned with the actual planning and financing of the library building itself. Again, these problems are found to be either of interest or of concern to the educator, for they are, as generally classified, either similar to the problems of the school building or caused by the schools, as will be seen.

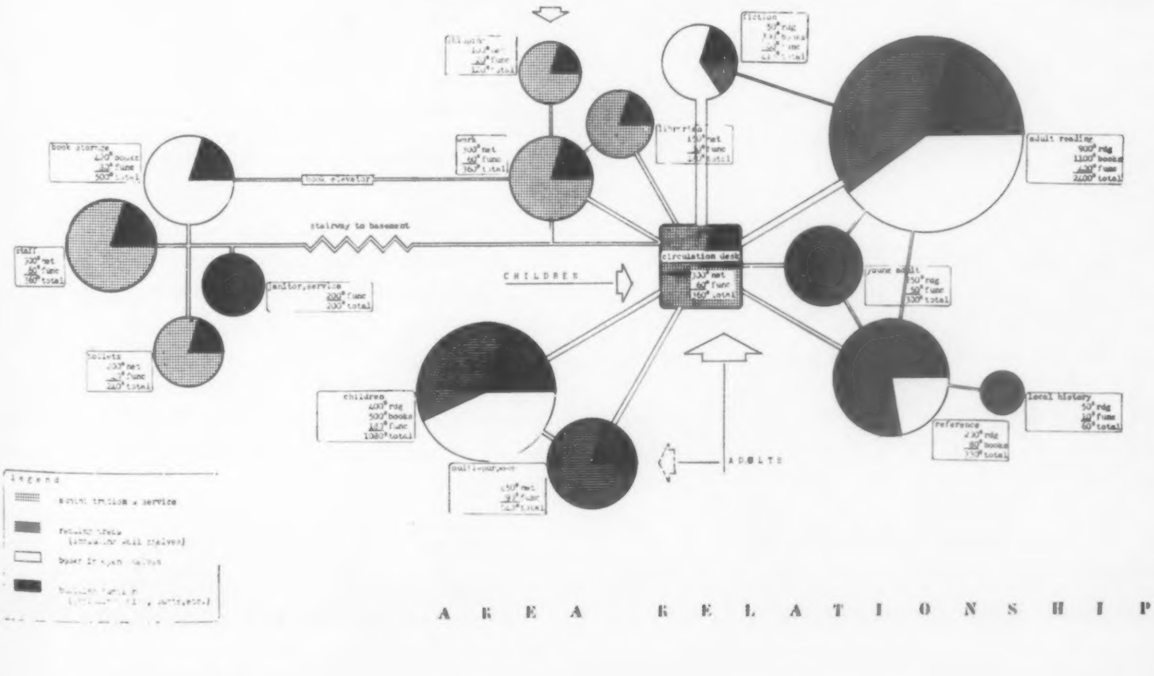
The determination of building costs for a library involves several steps which include establishing the amount of building area needed to house the facilities. A survey of total community needs should be conducted, together with a comprehensive preliminary study which relates existing facilities to present and future building requirements.

The survey to determine the building requirements for a new library, like that for a new school, projects population growth figures. Today, in fact, these figures are often found to have already been compiled for the area by the school. However, unlike the school, these figures cannot be directly related to the library, which of course does not have compulsory attendance.

The population figures, then, must be interpreted by the library director and the architect with experienced judgment. As a result, the answer, in terms of building requirements, is a studied approximation. The actual library building, even more so than the school, must therefore have a high degree of flexibility.

Ben Schnall

Area relationships of the Manhasset Public Library are depicted below. Ninety percent of all books are on open shelves. The steel columns which support the roof were designed for maximum slenderness. The roof is carried on exposed wood girders. The acoustic ceiling is of perforated asbestos-cement panels in their natural color. Flooring is resilient vinyl-asbestos tile in a warm marbled gray, with yellow feature strips. Library shelving and equipment is in natural birch heartwood. Chairs are in the molded plywood design of Charles Eames, in natural walnut.



A R E A R E L A T I O N S H I P S

A glass partition separates the children's room from the adult department of the Manhasset Library. Two L-shaped service desks are provided which abut each other on either side of the glass. A section of this partition behind the desk slides open, permitting one library assistant to serve both departments during slack times. During busy hours the glazed panel is kept closed.

Ben Schnall Photos

The children's room and adult department of the Manhasset Public Library have a common lobby with separate doors into the two areas. Each department can be viewed from the other.

Future growth of the system is projected considering such factors for growth as expansion of the building itself, by establishing branch libraries and by the use of "bookmobiles."

The relationship to the school is of prime importance in this determination of present and future size. More space in the library is required for high school students than for any other group. In fact, maximum use of the suburban library occurs at the time students are preparing term papers. Also in this connection, work areas are required for servicing the special book collections maintained in the school.

The facts interpreted from the survey may be directly related to the library building in such terms as book capacity, numbers of readers' seats, supporting work areas, etc. Conversion factors and formulas are next utilized to make the first approximation of building area requirements and cost.

A difficult situation is presented all too frequently when purely arbitrary amounts of money are appropriated for the new library building. Such sums are not based on a knowledge of the required library service in terms of building needs. Usually they represent a personal appraisal of an amount which somehow is felt will meet with approval by the voters. Consequently, the actual building costs are underestimated, cannot be justified and do not permit a satisfactory building solution.

A very similar problem is presented when an old building, for example the vacant and obsolete school building, is offered for re-use as a library.

Selecting the Library Site

Related to this is the problem of the library location. Few people realize, educators included, that in general the criteria for determining the site of the suburban public library are the same as for the retail store. It has been conclusively shown that a convenient location, despite suburban automobile usage, results in a far greater use of the library, measured in such terms as the number of readers, registration, number of books circulated and the general use of all the facilities. In the last analysis, these are the only measures of the success of a public library.

Library sites selected for their proximity to schools, sites with their buildings designed as monuments to civic egotism, etc., are poor investments.

If the suburban library site is located in the busi-

ness district, the land cost will be relatively high. Yet, to economize on land costs is a false saving. If the cost per book circulated is high, and the location of the library is a major factor in this respect, the taxpayer is certainly not benefited. He is just not getting his money's worth, and, even more important, fewer citizens will receive the benefits of library usage.

It may be of interest to interject here a portion of the report of the jury of *The School Executive* magazine's Fourth Annual Competition for Better School Design. The jury recommended "that more attention be given to site selection even at greater cost; the end result would permit educational as well as construction advantages which would far outweigh the additional costs of land."

The proper library site is considered to be so important by library directors and consultants that it will usually be recommended, if possible, to add to an existing facility, or to establish a branch library, if the alternative is loss of a good location.

What to Do With Teen-Agers

The great and increasing use of the suburban library by the teen-ager presents another planning problem. Specifically, what provisions should be made in the library building for the junior and senior high school student?

Children have their own separate section and the transition of teen-agers to the adult section can often be a difficult one for the library. Special areas have been designed for the use of the teen-ager. The type of space and the facilities for this area present the real problem.

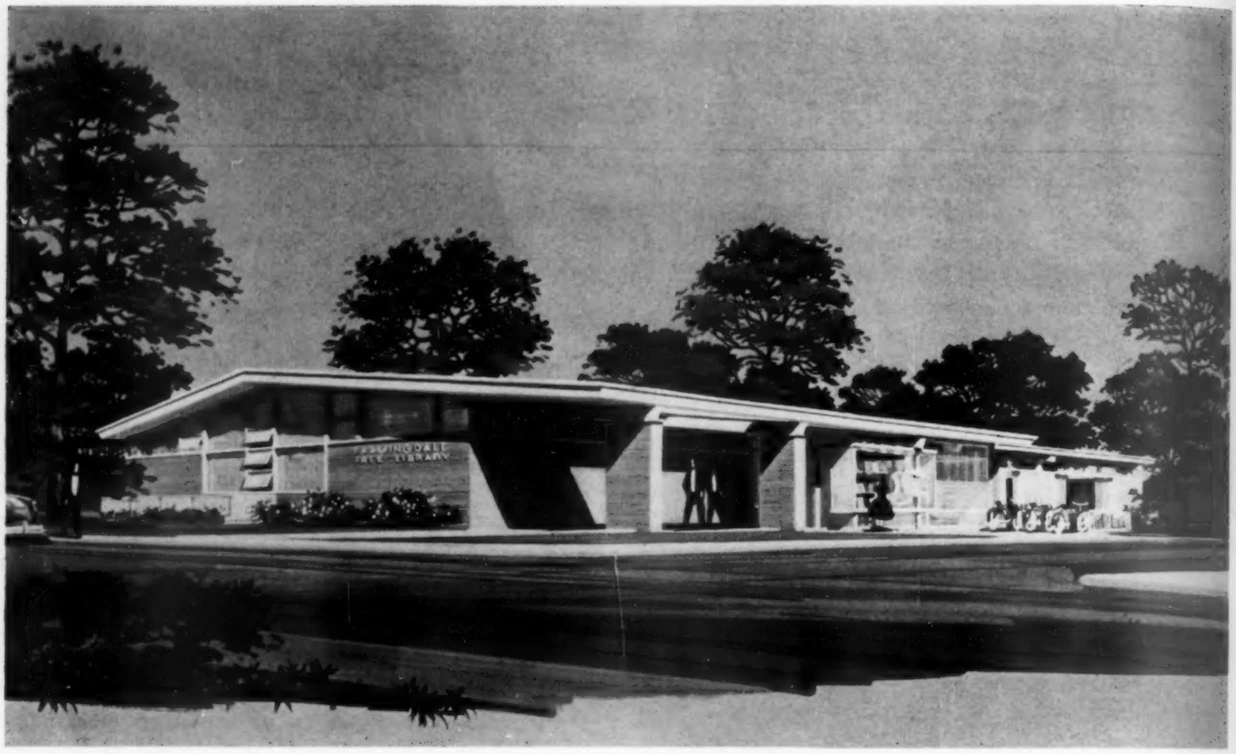
Experience has shown that a completely separated or segregated area, because teen-agers are supposedly noisy and inconsiderate of others, is probably not the best solution. This type of area has merely increased the disciplinary problem in regard to the high school student who uses the library as a clubhouse and trysting place. Such disciplinary activity should not be the function of good library service.

Moreover, the teen-agers' use of the library to do the work assigned in the school classroom must permit access to the card catalog, to the reference section and the stack areas. Reference books are expensive, and their use usually requires the services of the trained reference librarian. The average suburban library cannot afford to provide this service and collection in duplicate. This means that the young adult cannot be expected to remain in just one area within the adult section, regardless of the theory behind the planning.

Segregation Is Not the Answer

The best solution will, therefore, not attempt to segregate the teen-ager. Rather, it will provide an area which is a part of the adult section and in which books

Aesthetic qualities of unhidden structural elements are basic to the building design.



An important provision in the plan of a new suburban public library is ample parking space. This is not neglected in the overall design of the public library for Farmingdale, New York.

for this age group are located with other reading facilities. This recognizes the obvious fact that the young adult must have the use of the entire adult section of the public library.

Also, in recognition of this fact, a reading lounge is often planned in which the adult can find respite in the library from those users of high school age. This emphasizes the fact that students using the suburban public library constitute such a majority that it is often found to be more desirable to separate the adult from the young adult, than vice versa.

In planning the suburban library building, the various components of the library must be considered in terms of the services required. This includes, in addition to the main elements, such specialized requirements as an adult lounge, special book collections, local history collections, music collection, sound systems, displays, community meeting room, exhibition room, a story-hour room, work areas for branches and school collections, bookmobile facilities, etc. Some of these elements may be combined in dual purpose areas. All must be considered for inclusion in relationship to the needs survey.

Preparing the First Drawings

After determination of the program of building requirements, the various elements must be sized and related. The library architect's first drawings do not represent an actual plan. Rather, a diagram of the elements to scale and their spatial interrelationships should be undertaken. Such a preliminary step can radically alter, for the better, the contemporary library as apart from traditional concepts of library planning. In this respect, there is no apparent difference between contemporary vs. traditional planning of the library and the school.

The Element of Control

One result of the unified study approach to library planning concerns the primary element of control—the main desk—and its relationship to the main division of the adult and children's sections. It should be explained that there are two traditional relationships of these elements in the smaller library. These are the complete separation of the adult and children's sections with two separate desks and entrances; or no separation whatsoever, with one central desk and entrance.

Now, most librarians agree that no separation is preferable. This standpoint is based on the theory that having the two sections of the library opened together psychologically benefits the child. He is more familiar with and feels he is a part of the whole library. Further, this openness promotes and enhances his anticipation of graduation into the adult section. The end result is interesting and desirable; the child is found to be more likely to continue as a regular library user, even after adulthood.

Many librarians, though, will not sacrifice to chil-

dren two other important elements, building circulation and sound control. This has often resulted in complete separation of the children's and adult sections of the library.

A diagram of area relationships suggested the following solution. The library plan consists of a main entrance into a single lobby. From the lobby separate entrances lead into the children's and adult sections. Separating the two sections is a wall of clear plate glass from floor to ceiling.

Two complete L-shaped desks are provided, abutting each other on each side of the glass partition. A section of this partition between the desks slides open, forming one U-shaped desk, and permitting a single desk to serve both sections at slack times of the day. During the busy hours the glass panel is closed and two separate desks are again operated.

This solution provides the required sound barrier. At the same time the objections to a separate children's library are overcome by the use of a common entrance, and by giving the children a visual familiarity with the adult section. Additional benefits, such as economy of operation, are obvious.

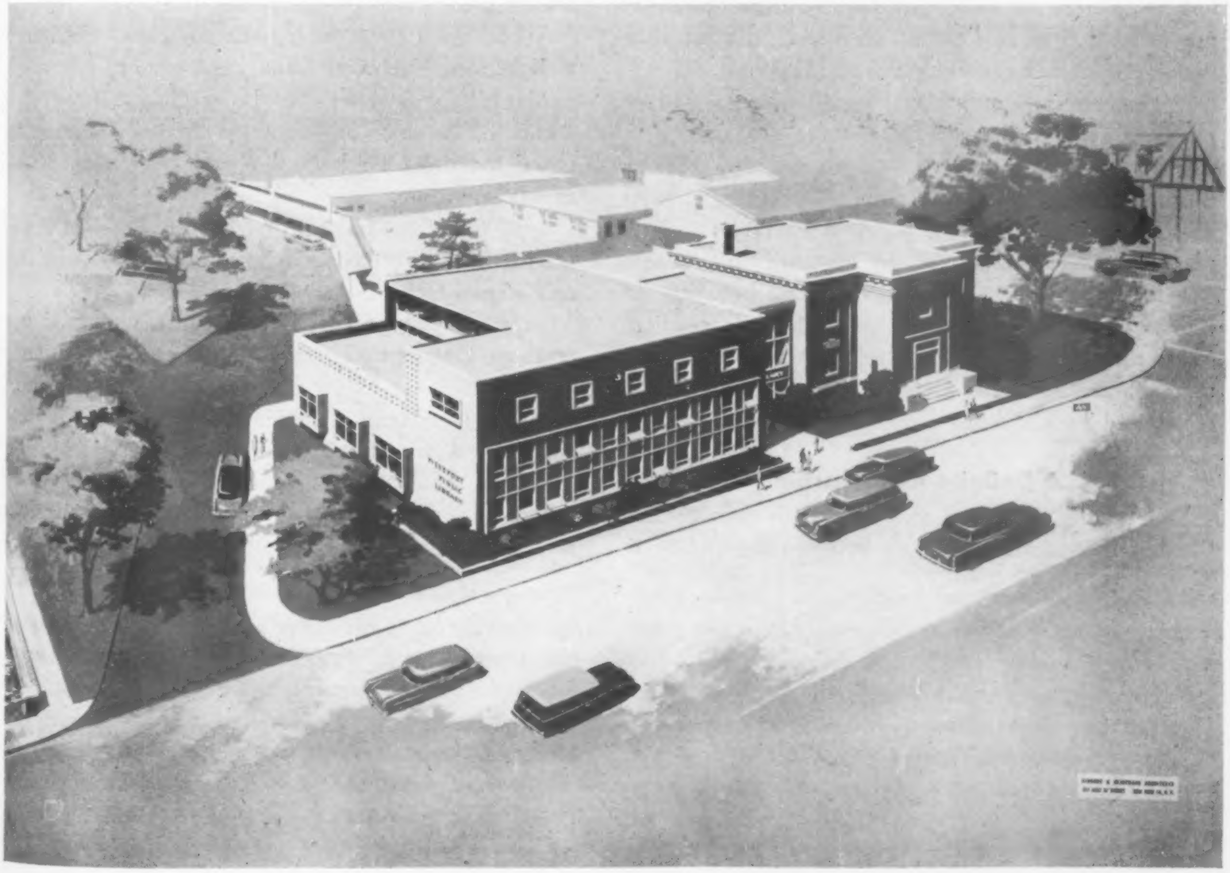
Following determination of the type and relationships required, the elements of the library must be sized. This is done initially, calculated on experience with similar requirements and services. Present and future needs must necessarily be approximated. Therefore, the size and relationship of the elements should be subject to future change. For these reasons, flexibility of areas is a requisite. How to achieve this flexibility is the problem.

The highest possible degree of flexibility is obtained by partitioning the areas within the three main divisions of the suburban library by means of the library's basic unit of furniture—the shelving unit.

Permanent partitions must be kept at a minimum in the interest of maximum flexibility in rearrangement and resizing of the several areas. By relocating the shelving unit this may be accomplished with relative ease. There are no closed book stacks. All books are in shelves open to the public.

No sacrifice in function is made in utilizing the shelving units as partitions in place of the usual wall construction. Full visual control may be had by use of the standard seven-foot high units. Sound may be controlled by installing glass above these units to the acoustic ceiling. Plan use and rearrangement is facilitated by establishing the standard three-foot width of the unit as a basic building module. The lower height

The location of a library is most important. In Westport, Connecticut, it was decided to add a section to the old building rather than give up the successful old site for a complete new plant located in an out-of-the way area.



Ben Schnall

The exterior of the Manhasset Public Library, Gibbons and Heidtmann, architects, is red brick with white trim. Overhangs shield the windows from the summer sun. The library blends well with the homes of the adjoining residential area.

units result in another type of spatial division where only circulation need be controlled. Additional benefits are realized from this overall treatment in a sense of spaciousness and light within the building.

There is yet an additional consideration in library planning. Too often, as is sometimes the case with schools, the design of the building is divorced from its furnishings. For flexibility and overall planning, it is an absolute necessity that the architect's services include planning the furnishings of the contemporary library.

Many comparisons have been drawn between the college and university library and academic standing. There can be no doubt that a relationship exists. Minimum library standards in terms of book capacity are recognized by all colleges and universities.

A Definite Relationship

It follows, therefore, that there is a definite relationship in educational values between the public library and the public school. This fact, however, is not always recognized by the parties concerned.

The great need for additional school facilities is well known. For exactly the same reasons, additional public library facilities are also required. However, if additional facilities are obtained for one and not the other, the present relationship will be worsened as it affects education.

It, therefore, follows that the local public library service is of direct concern to public school educators and administrators.

The apathy of the general public and local government toward its library is also well known. However, it does not follow that educators, administrators and elective education boards worthy of their positions should be a part of this general lack of appreciation of need. On the contrary, it is in the best interests of the school system to support the public library actively in its community relations and otherwise.

HOW SHALL WE FINANCE NEW SCHOOL BUILDINGS?

by EDGAR L. MORPHET

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Edgar L. Morphet served for a number of years in state departments of education and has assisted approximately one-half of the states with studies of various aspects of their educational programs. He has been at the University of California since 1949 and during the current year holds a Fulbright at the University of Hong Kong.

John E. Corbally, Jr. received his Ph.D. degree from the University of California, Berkeley, in June, 1955. Prior to this he had teaching and administrative experience in the State of Washington. He is presently assistant professor of education at Ohio State University in the field of educational administration.

SUBURBAN areas in northern Illinois received special attention during July of 1955 in a national magazine. The severe school building shortages in rapidly growing residential districts constituted the subject of the account. Several local school districts, having reached their bonding capacity, were turning to builders' assessments—a tax upon each completed home to be paid by the builder—as a partial solution to the problem of financing school buildings.

A California subdivider, building homes near San Francisco, also received national attention when he left several homes in a subdivision unfinished so they could be used for school classrooms on a rental basis in a district which had no financial leeway for new school buildings.

These are two examples of special efforts to provide facilities in districts faced with acute school building problems. Many others could be given. The financing of new school buildings is undoubtedly one of the most pressing problems in American education today.

Sound Planning Is Essential

In view of the serious situation which exists in communities throughout the nation, it is appropriate to raise the question: Have people in most states and in the nation really faced the question of providing and financing new school buildings? In most cases thus far, the school plant problem seems to have been treated as an emergency matter to be met on a basis of expediency rather than in terms of long-range planning.

Certainly, emergencies exist. But failure to acknowledge the continuing, long-term need for new buildings—both for increased enrollments and for replacements—can only compound emergencies.

Under ordinary conditions, from 2 to 2.5 percent of the classrooms and related service areas in the nation would become obsolete and have to be replaced or completely renovated each year. This problem will always be present and will not be solved by emergency measures which are expected to be used for two or three years and then discarded. There will always be districts which will not be in a financial position to meet even these ordinary needs.

At the present time, there are not only normal replacements which should be made, but also a tremendous backlog of unmet needs exists, chiefly as a result of neglect during the depression years and the inability to do any building in most areas during the war years. The problem has been further complicated by increased costs and high taxes.

On top of these complications, there are rapidly increasing enrollments resulting from high birth rates, with the certainty that enrollments will continue to increase rapidly for at least the next decade. Building space has already been increased (but not as much as it should have been) and will have to be increased even more sharply in the near future to care for these enrollments. The situation in many areas—and especially in new or expanding suburban "bedroom" communities—has already become so acute that it seems almost hopeless.

Thus it is apparent that both a long-range and an

emergency problem exist, neither of which can be solved satisfactorily by gestures in the right direction, or by expediency actions. Careful study and planning on local, state and national levels—going beyond what has already been done in most communities and states—are essential.

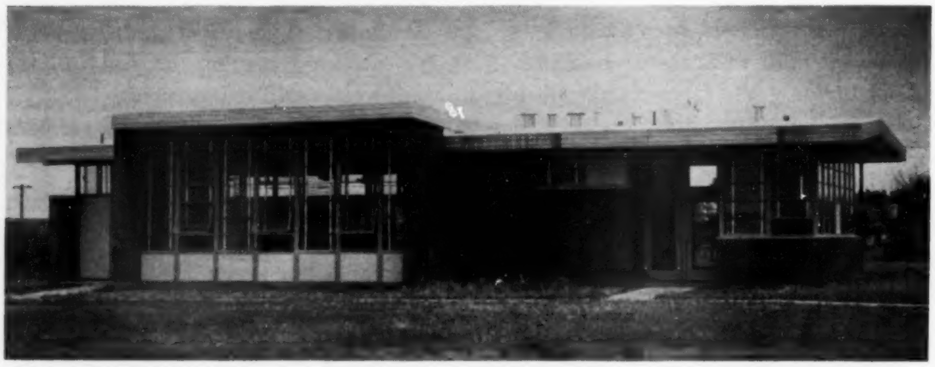
In view of the high costs and the tremendous amount of building required, some have questioned whether or not America has the resources to provide satisfactory schools for all. There are communities in every state which obviously do not have sufficient resources to enable them to finance needed school buildings. There are states which may not have sufficient resources to do a satisfactory job. But the people in most states—and in the nation—can finance the construction of needed buildings if they desire to do so. The fact is, they must do so because they cannot afford to handicap or neglect the education of our children.

Financing Is Not Only a Local Matter

Generally, until very recent years, states have considered the financing of public school building construction (capital outlay) to be a local responsibility. Districts have been expected to provide local revenues to meet their needs, either from current taxes or, commonly, from the proceeds of bond issues. Bond issues in many states must be approved by two-thirds of the local electors or by property owners. The amount of bonds which could be issued has ranged from 2 percent of the assessed valuation of the district in Indiana and Kentucky to 20 percent in a few states.

Recent studies support the following observations and conclusions relating to the situation which confronts many districts:

1. Even in large-district states, such as Utah, Maryland and Florida, the more wealthy districts have from 7 to 20 times the ability to meet their capital outlay needs as the less wealthy. In small-district states, such as California, the range is several hundred to one.
2. With existing provisions for limiting bonds to a percentage of the assessed valuation in the district, and with existing ranges in ability among the districts, the less wealthy districts and often districts which should consolidate, have no way of meeting their building needs satisfactorily. Many of these districts are bonded to capacity and have no additional resources for buildings.
3. In many rapidly growing school districts the school population and the need for buildings have far outstripped increases in assessed valuation of property. The result has been that such districts have become progressively less able to provide more school buildings. Marked increases in the cost of construction have further complicated the problem.
4. Bond limitations in most states relate to the assessed valuation of property in each district. In many states the assessed value of property has increased far less rapidly than the actual value. Sometimes the limitation has become unrealistic and tends to handicap districts unnecessarily. When local assessment ratios vary from county to county, as they do in a number of states, there are districts which are likely to be more seriously handicapped than others.
5. Many local and state building codes continue provisions which have become obsolete or which otherwise add unnecessarily to the cost of construction. Some of these place artificial and undesirable handicaps on such districts.
6. There are school districts which, because of local pride, a failure to plan wisely and economically, pressure from athletically minded citizens or other factors, have become involved in overly expensive construction that is unnecessary; and thus have impaired their ability to meet new housing needs satisfactorily.
7. While state aid for current expense helps to relieve the property tax burden and assures the provision of reasonably adequate personnel and services, it does not solve the capital outlay problem, particularly for many financially hard pressed districts. In fact, state funds for current expense are not likely to be used efficiently in districts which are handicapped by poor housing.



Until recent years states have considered the financing of public school building construction to be a local responsibility. This Homemaking Cottage in Perrin, Texas, Stanley Brown, architect, was constructed by the Perrin Independent School District.

Hube Henry, Hedrich-Blesssing

Once a new building like the Lincoln Way Community High School, Will County, Illinois, by architects Childs & Smith, is financed by a local school district, financial assets are apt to be exhausted.

8. While state financial assistance has relieved numerous local school districts of the necessity for supporting the current school program entirely from the proceeds of local property taxes, no such change has been made in many states in the basis for financing school construction. Although the economic base has changed greatly during recent years, states which provide little or no financial assistance for buildings require that school building construction continue to be financed entirely or almost entirely from local property taxes. Such a point of view is unrealistic and results in many inequities.
9. Although the problem is likely to be most acute in poor and in rapidly growing districts, it does exist in other districts and will continue as long as there are schools and school districts.
10. Token or emergency aid may help to alleviate the situation in some areas, but it will not solve the long-range problem with which the people in every state will be confronted. A long-range plan, based on sound principles of equalization, should be developed sooner or later in every state.

Early Types of State Aid

The earliest type of state aid for capital outlay was designed to stimulate consolidation. Usually only token amounts were provided. Most of these early developments have been classed as crude, inadequate systems wherein the principles of equalization are not recognized or applied.

Following the close of the last world war there were states which, confronted with a tremendous backlog of building needs accumulating since the depression and with a rapidly growing school population, began to face this problem on a sounder basis than at any previous time. Some states, which earlier had provided only token amounts, increased their state aid for capital outlay considerably and others began to make some kind of building aid provision.

At the present time, more than twenty-four states have made some provision for state assistance in financing public school capital outlay programs. However, the soundness of the plans and the adequacy of the amounts still vary considerably.

A Desirable State Finance Plan

Before considering the plans which actually have been employed to give states a share in the financing of new school buildings, let us examine theories which concern an ideal state program. The following characteristics of a state plan for financing school construction are recognized as highly desirable by many authorities in the field.* It is agreed that they should apply to long-range programs for financing public school capital outlay which incorporate provisions for meeting existing emergency needs.

General Considerations

Each state should make adequate provision for state participation in the financing of capital outlay pro-

*Adapted from *State Provisions for Financing Public School Capital Outlay Programs*, U.S. Office of Education Bulletin **1951**, No. 6; and from Field Service Leaflet No. 1, University of California, Department of Education, Berkeley.

grams. There is evidence that in no state can all local school districts develop adequate school plant programs on the basis of equitable local effort, without state assistance.

The state program for financing capital outlay should be developed through sound, comprehensive studies. Only when a plan is worked out on the basis of comprehensive studies which provide pertinent evidence that all needs will be met equitably, should the program be considered satisfactory from a long-range point of view.

An acceptable program should provide adequately and equitably for all essential school plant needs. While a state program cannot guarantee state funds in sufficient amounts to meet the desires of all communities, it is essential that the funds provided will enable all communities to meet their basic requirements.

One of the new schools needed and being financed by Cedar City, Utah, is the North Elementary School, L. Robert Gardner, architect.

Homer Jones

The state plan should meet both emergency and long-range needs. The state plan should be sufficiently elastic to permit all needs to be met as they arise. To assure that accumulated needs can be met, it may be necessary to authorize districts to borrow funds (perhaps through the state), within reasonable limits, in anticipation of state grants; and to use such grants later, in part at least, to retire the indebtedness thus incurred.

All districts should be eligible to participate in accordance with their needs. There is far greater community interest in the program and less danger of undesirable state control if all can participate, than when only the less wealthy districts or districts with most urgent needs are involved.

Aspects of Finance

The state plan for financing capital outlay should be developed as an integral part of the foundation program of education. Whether capital outlay is financed from a special purpose fund or through a comprehensive foundation fund is not too important, as long as proper relationships with other phases of the educational program are assured.

The program should provide continuing state grants or grants and loans, rather than loans alone. While loans may be of some assistance to many communities, they will not suffice to meet the needs of poorer communities unless state grants or a combination of loan-grant funds are provided.

The program should be financed through an equitable combination of state and local revenue. Partnership plans which support all phases of the school program have proved to be more satisfactory than plans which provide state funds on the assumption that local districts will make the necessary local effort to provide needed facilities.

Funds for the long-range program should be derived chiefly from current state revenues and, insofar as practicable, from current local revenues. State bond issues may be justified for meeting emergency or accumulated needs, but such issues should be unnecessary and undesirable for the continuing support of the long-range program.

An objective formula for apportioning funds should be included in the law. The law should incorporate basic provisions for measuring local need and ability and for apportioning funds. Subjective formulas tend to result in inequalities and injustices and are more likely than objective formulas to oppress local school districts with undesirable state controls.

The program should encourage an equitable local tax effort. If assessment practices are not uniform throughout the state, some plan for determining and using assessment ratios or indexes of taxpaying abilities should be used. Each district should be required to make an effort to participate in the program.

Each local school district should have a reasonable margin of local tax leeway and bonding ability. Many communities in every state will desire better plant facilities than those which a basic program can provide. Communities should therefore be in a position to make the additional bond or tax effort to finance these facilities if so desired.

The program should be administered by the state department of education. To avoid confusion and de-

lays and to center responsibility in the state agency best qualified to consider problems in light of educational needs, the responsibility for administering the program should be given to the state department of education. If building plans need to be reviewed by some other agency, such as the state fire marshal or the state department of health, the state department of education should take the necessary steps to obtain such review and clearance.

The program should place emphasis on local responsibility and state leadership. Only the basic requirements, in the form of broad and essential standards which must be observed to assure efficiency and economy and to guarantee that the plant facilities will meet the minimum needs, should be prescribed by the state. Maximum responsibility for planning the local program should be placed on the local school district.

Comprehensive local school plant studies should be required. These studies should include a sufficient area (in most cases at least a county) to provide for the proper location of permanent elementary and secondary school centers, regardless of existing district boundaries. They should encourage organization of more satisfactory districts where needed.

Each local school district should develop and adopt a long-range program. This program would show the location of permanent elementary and secondary school centers, and the steps to be taken for new schools and their financing.

Funds for Permanent Centers

The state program should make certain that all necessary facilities can be provided at permanent school centers. State and local funds should be available for use only at permanent school centers. In smaller districts, plans may need to be developed for financing such construction through the county office.

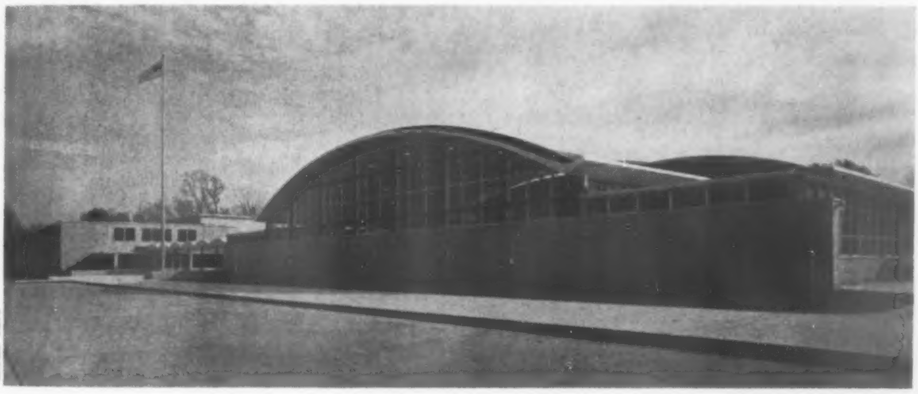
Building plans and specifications should be submitted to the state department of education to make sure they conform to the few broad minimum standards. The state should not have blanket authority for approval without reference to limited, objective criteria.

Local initiative in the development of plans should be encouraged. Care should be exercised to avoid the possibility of state dictation of the local instructional program, resulting from specifications regarding the kind, shape or size of rooms and related areas that may be built to house the program.

Except for funds for strictly emergency programs, districts should be permitted to use capital outlay funds provided through the program either during the current year or to place such funds on deposit so they can be accumulated over a reasonable period of time and used as needed.

Basic Capital Outlay Funds

Basic state and local capital outlay funds should be required to be used for bona fide capital outlay purposes or for debt service under certain conditions. Capital outlay should be defined to include sites, construction or alteration of buildings, equipment and necessary architectural services. The funds should be available for debt services to retire obligations for permanent centers incurred after the program has been established, or to retire existing capital outlay indebtedness after provision has been made by the local school district for meeting all current capital outlay needs.



Lens-Art

Dearborn, Michigan, was able to meet the problems of rising enrollments with the new Edsel Ford High School. Architects are Eberle M. Smith Associates, Inc.

Present State Provisions

The above statements present generally accepted characteristics of a desirable state program for financing new school buildings. What is being done at the present time by the states in financing school buildings? Only slightly more than one-half of the states have made any provision at all for state support of capital outlay. Even in these states the soundness of the plans and the adequacy of the amounts provided vary considerably when judged on the basis of the criteria listed above.

Although there are many variations in provisions from state to state, the major trends may be summarized as follows:

1.) Several states have developed miscellaneous types of grants which in most cases have not been directly related to need. Several of these grants have provided a designated amount per district or per school. Sometimes local matching funds have been required; in

other cases the grants have been small and local funds have been necessary although not directly required. Among the states which have begun programs on this basis are North Carolina, West Virginia and Missouri.

2.) A few states have developed "holding company" or state building authority plans. Kentucky has been using local building authority company plans for a number of years, and districts have been able to obtain buildings when the amount required far exceeded the ability to issue bonds based on assessed valuation. However, the interest rate has been higher than would have been necessary if a realistic program had been developed.

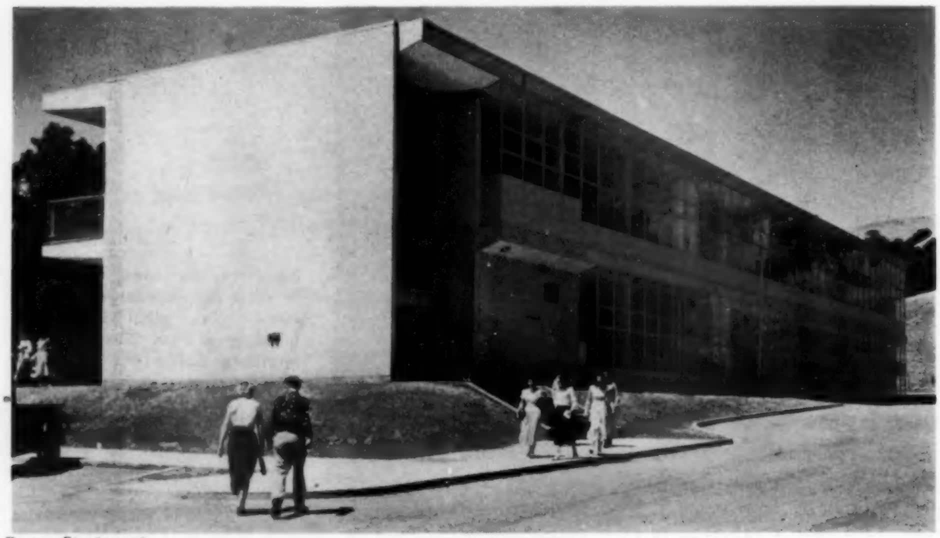
Pennsylvania has established a state authority which is authorized to provide buildings as needed and to "rent" these buildings to districts which agree to pay a prescribed amount each year. Some of the local payments may be made in part from state equalization funds. So, indirectly, there is some state assistance on an equalization basis.

3.) Most of the states thus far have developed some type of plan which is designed only to meet emergency needs. In Washington, an equalized matching formula has been prescribed which enables the least wealthy districts to obtain assistance, within the funds available, up to 75 percent of the cost of a building; while wealthier districts may obtain funds up to 25 percent of the cost. The California plan is of this type since the funds provided are only for districts which are not otherwise able to finance their emergency capital outlay needs. The California funds are made available on what is commonly termed a loan-grant basis.

4.) A few states have developed long-range programs with provisions for meeting both emergency and long-range needs. For example, Florida includes in the foundation program $400 a year per classroom unit in each district for capital outlay purposes. The foundation program is financed by a combination of state and local funds on the basis of need and ability, with the more wealthy districts providing a larger proportion of the funds required for their own program than the poorer ones.

The plan is designed to enable each district either to replace or materially alter all of its buildings over a 50-year period and to provide for new buildings resulting from increases in school population. Buildings may be built only at permanent centers selected on the basis of a thorough study. Provision is made for a state corporation to issue bonds and to lend funds to districts which have emergency needs and are not able to finance the necessary construction through local bond issues. The funds thus advanced are paid back over a period of years from the amount available to the district through the foundation program for capital outlay purposes or from the proceeds of local tax levies for debt service.

As indicated above, there are many variations within these major trends. No two state plans are identical. In some states, for example, the funds are provided and the program administered through a special agency established for the purpose of administering the program or by some designated agency other than the state department of education. In a number of states the program is administered entirely through the state department of education.



Roger Sturtevant

Funds in California are available on a loan-grant basis to districts not otherwise able to finance emergency capital outlay needs. Martinez, California, was able to finance the new Alhambra Union High School designed by architect John Lyon Reid, AIA.

In most states with emergency grant plans, funds are provided only for individual projects on the basis of approved applications. In such states there are a number of state controls and requirements which must be met in detail. In the states with long-range programs, however, the funds usually are given to properly organized districts for use at permanent centers with a minimum of state controls. In certain states the funds are granted on the basis of relatively objective measures of need; while in others, need is considered only in a very rough way or the measures are subjective, and to

that extent, they are likely to be relatively unsatisfactory.

Thus, state programs for financing capital outlay which have been developed so far are characterized more by their differences than by their similarities. It may be expected, however, that coming years will bring about increasing similarities in certain basic respects. Experience has shown that certain practices are less defensible or desirable than others. Authorities in the field have already been able to recognize certain basic principles and criteria that can safely be used for guidance in any state. It may reasonably be expected that such criteria will be more generally observed in the future than in the past, with the result that more state programs will have a larger proportion of satisfactory features and will come nearer to meeting school needs than some of the programs operating at the present time.

It can be seen that these trends conform in varying degrees to the characteristics of a desirable state program. A complete critique of each type of plan and the combinations of various types is beyond the scope of this report. It is clear, however, that some of these plans are mere gestures in the direction of the principle of adequate support for school buildings. Others, particularly the temporary grant plans, ignore the fact that conditions in a local district change and that a district with limited ability at present may have considerable ability a few years hence. Still others involve so many subjective elements and potentially centralized control that they obviously can be considered only as emergency expedients.

Meeting Long-Range and Emergency Needs

In order to indicate more fully the strengths and weaknesses of certain plans which are receiving much attention currently, it would seem valuable to discuss them in more detail. Accordingly, the building authority plan, the loan-grant plan and the foundation program plan are presented here. It must not be assumed that these three plans represent the final answers to the problem of financing new school buildings and that the only effort required in a state is to choose one or the other of these plans. It is entirely possible that the best solution for a given state is a plan that is as yet unknown.

Building Authority Plan

During recent months the building authority plan has been advocated as a desirable approach for answering school housing needs. It has been proposed almost as a panacea. Theoretically, it may be used by local school districts as well as states.

Even a brief study will show that it will not solve the problem of many local school districts unless bonding limits are removed entirely, in which case there would be no need for a building authority. Moreover, the less wealthy areas would still not be in financial position to provide needed buildings. The red tape that would be involved, the high interest rates and other similar factors would seem to rule out the local building authority plan as a satisfactory solution. At best, it can be considered a cumbersome and costly expedient which should be avoided if at all possible.

The state building authority plan seems to have greater potential than the local plan. It provides a way of getting buildings constructed for districts that would be thwarted by bonding limits—that is, it does if state laws can be changed to make it legal for districts to obligate themselves for annual rental payments. This process has already presented some complications and delays as a result of necessary court action. It requires that some continuing long-range costs be paid from current revenues. It makes possible lower interest rates than districts, which establish building authorities, could hope to obtain.

However, there are other matters to be considered. Districts with limited wealth cannot afford to obligate themselves for continuing rental payments without danger of incurring an excessive tax burden or taking funds that should be used for the current operation of their schools. Pennsylvania and Georgia, the states which have used the building authority plan most extensively, have already found it necessary to provide state funds to help poorer districts pay their rental.

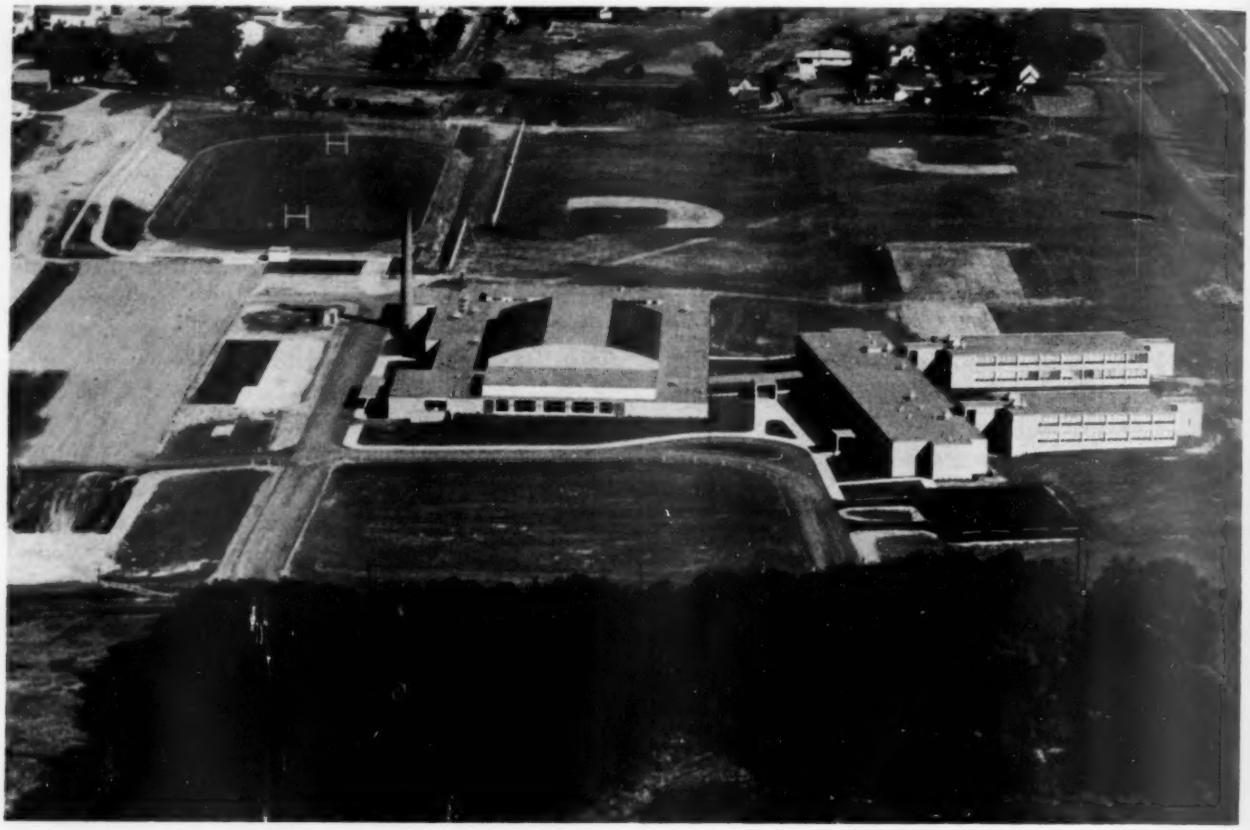
There is some evidence that interest rates paid by building authorities on funds they must borrow may be somewhat higher than interest rates on loans which are directly recognized as an obligation of the state. Any such higher rates are, of course, passed on to the districts which have to pay the rental on buildings. Then they are passed back to the state if state funds are provided to help with rental payments.

Centralized Administration

Finally, there is the whole question of overhead and centralized administration. How much more—or less—does it cost to establish a state organization which not only borrows money, but constructs and rents school buildings? How well can local initiative and responsibility for the educational program be safeguarded under these conditions? What is the probability that the state may eventually come to determine much of the local instructional program because the demand for conformity to state requirements for rigid building economies may ignore educational needs?

No one knows the answers to questions such as these at present. They represent matters which should be studied carefully before the building authority plan is accepted as the best solution to the housing problem.

Since new state laws are required to establish building authorities, it is also appropriate to question whether or not it would be better to change any unrealistic laws relating to limitations and use a more



An extensive and complete secondary school plant was provided for Ramsey County, Minnesota, with the building of the Alexander Ramsey High School. Architects are Magney, Tusler and Setter.

direct approach for solving this type of problem.

Loan Grant Plan

As a contrast to the building authority approach, California has developed a loan-grant plan. The state has been authorized to borrow substantial amounts to be advanced to districts which have practically reached their borrowing capacity and still cannot provide the buildings needed. The voters of any such district must vote in favor of this advance or "loan" and an application must then be filed with the state. If the district meets all requirements and the loan is made, it must build in accordance with rigid state standards as to space, materials and costs. Payments are then made on the loan, plus interest.

Theoretically, the payments on all indebtedness, including local bonds, do not exceed an amount equal to 40 cents on each $100 of assessed valuation each year, but the payments in some cases exceed that amount. No payments on interest for state loans are made after twenty-five years and any amount of principal remaining unpaid after thirty years is cancelled and thus becomes a grant to the district.

While this loan-grant plan has many commendable features, it also has weaknesses. It is basically an emergency plan designed to help districts where the building situation is most acute. Districts must submit applications which require much time and detailed information. State space limitations are so rigid that many districts apply only as a last resort because they believe they will be handicapped in conducting the kind of educational program they desire.

Assessed valuations are used and since valuations are not uniform, districts in counties with high assessment ratios pay back much larger sums in proportion to their ability than districts with low ratios. Moreover, the allocations are made by an agency other than the state department of education. This agency may not understand or appreciate the significance of some of the educational problems involved. However, details of the plan have been improved considerably since it was first established and steps are being taken to overcome some of the other weaknesses.

Foundation Program Plan

Several states have developed a foundation program plan as a means of providing for long-range as well as emergency needs and to help avoid undesirable state controls.

If it is assumed that a building should last approximately 50 years before major alterations or replacements are needed, it is possible to determine the annual

amount required for adequate housing facilities and to accommodate increasing enrollments. Suppose studies show that the cost of constructing and equipping reasonably adequate buildings is $30,000 per classroom unit. (The classroom unit is defined in terms of the number of members of the instructional staff needed for a satisfactory school program, including all related service areas.) The amount needed each year to replace facilities 50 years hence would thus be $600 per classroom unit.

If each school system makes the required effort in proportion to its ability, and the state provides the difference, there will be available $600 each year for every classroom unit in each district in the state. Thus every district would be assured of sufficient funds to replace or completely renovate each building over a 50-year period. This would include the funds required for additional space necessitated by increased enrollments. A construction cost index could be used to adjust the amount on the basis of any changes in costs.

Districts, however, could not wait 50 years to accumulate enough funds to construct a building. But they would not need to do so. The large districts would accumulate enough funds to construct a new building every year or two. All districts, however, have some borrowing capacity which could be used to meet immediate needs, and the capital outlay fund could be used either to help repay such loans or to construct additional facilities.

One other step is essential for this plan to work satisfactorily. Provision must be made for the state, or a state agency, to lend money to districts which cannot meet their needs by funds borrowed within their bonding limits. The state must therefore be in a position to advance money beyond these limits to districts with unmet needs after their regular borrowing capacity is utilized. For these supplementary loans or advances, the $600 per classroom unit—or a large proportion of it—would be pledged over a period of 20 or 25 years, and the amount used each year to repay the loan. A new and more realistic basis for borrowing would thus be established.

With such a plan in operation every properly organized district in the state would be in a position to meet its housing needs as they arise. There would be no occasion for delays or emergency provisions based on expediency. Capital outlay funds, of course, should not be made available under this program, or under any other state program, for small or inadequate districts which do not include a permanent school center. Funds, however, could be accumulated for use when these districts are consolidated.

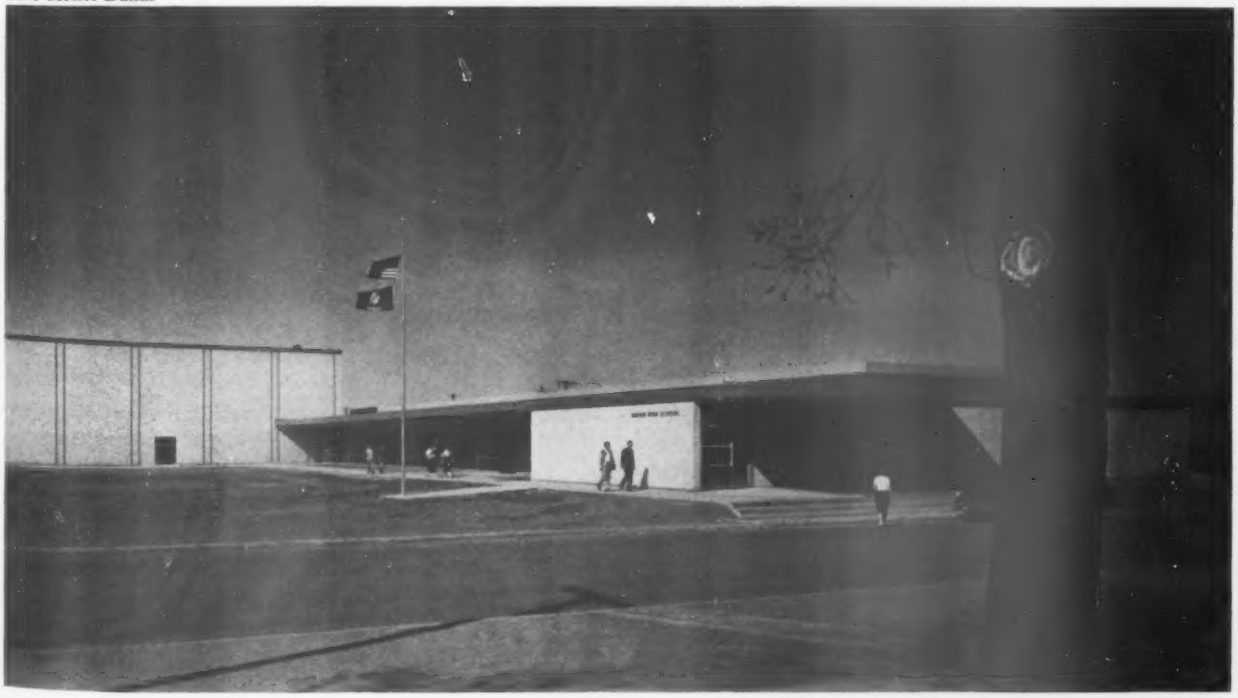
The program discussed above is not a theoretical proposal. In substance, it constitutes the basis for the plan which has been in operation in Alabama since 1935 and in Florida since 1947. South Carolina and Kentucky have similar plans. The Georgia program includes the basic elements of this plan combined with a type of state building authority plan.

Cooperation Is Essential

There have been many arguments over the extent

Limited finances forced the school board to eliminate a terrace included in the Guymon, Oklahoma, High School plan by architects Caudill, Rowlett, Scott and Associates.

Ulric Meisel-Dallas



of the schoolhousing shortage in America and proposals for meeting it. The fact that an acute situation exists cannot be denied by anyone who has studied the facts. Arguments over the extent of the shortage are largely beside the point which is that, in general, realistic or adequate plans for solving the problem have not been developed.

It should be evident that in every state there are some communities which cannot finance the facilities needed. States which have not done so, therefore, will have to develop plans and establish provisions for helping to solve the problem. States which have provided only token assistance or taken only expedient action will have to develop sound long-range programs.

The studies that are required and the action which should be taken cannot be worked out by educators or laymen alone. Cooperation will be necessary to ascertain and get agreement on the facts, to discover needs and to develop a satisfactory program which will meet the needs.

States and local school districts must cooperate in solving the problems which can best be solved only in that manner, and in providing the necessary financing to assure that new buildings can be constructed. When obstacles, such as inadequate districts, unrealistic bonding or taxing limits, poor assessment practices or obsolete building code provisions, that result in unnecessary costs are discovered, steps will need to be taken to see that they are removed.

States and local school districts should make every possible effort to see that a sound program is developed. In no other way can basic problems be solved. It should be evident that the cost of providing adequate school plant facilities throughout the state will not be any greater when the state cooperates with local school districts in financing the program than it would be if the financing could and would be done by local districts alone.

State-Local Effort Not Enough

However, necessary as it is, such cooperative state-local efforts will apparently not suffice, at least not for some of the poorer areas of the nation. As long as there is a range of two or three to one in ability of the states to support an educational program, the less wealthy states will either not be in position to provide adequate school facilities or will have to make an excessive effort to do so.

The people of the nation have the resources to assure adequate buildings for all children, and it is apparent that these resources should be used if the problem is to be solved. Again, a sound program is the key to the solution. Any federal funds which are provided should be distributed through the states on the basis of an objective formula which leaves states free to develop their own plans and programs and to use federal funds to supplement state and local funds in meeting the needs.

The problem of financing new school buildings in this country has not yet been solved satisfactorily in many areas but it can be solved if the American people cooperate in agreeing on a desirable program and in putting it into operation without any more unnecessary delays.

Each state in the nation must decide how it can best solve the problem of providing needed school buildings for its children. No set formula or stop-gap emergency solution should be regarded as a permanent plan.

THE SCHOOL AUTHORITY PLAN: PROS AND CONS

by WILFRED F. CLAPP

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Mr. Clapp received his B.A. degree from Kalamazoo College and his M.A. from the University of Michigan. He has been with the Michigan Department of Public Instruction since 1937. This is with the exception of two war years when he was senior specialist on school facilities with the U.S. Office of Education. Prior to 1937 he was school superintendent in Ovid.

and A. MILLS WILBER, JR.

Educational Consultant, School Organization and Plant, Michigan Department of Public Instruction

Mr. Wilber has an A.B. degree from Michigan State Normal College and an M.A. from the University of Michigan. During World War II he was a platoon commander of anti-aircraft artillery. From 1946 until 1951 Mr. Wilber taught social science at the Monroe, Michigan, High School. He has held his present position from that time.

THE school authority plan for financing school buildings has been receiving a great deal of attention and its merits and demerits are vigorously debated wherever those interested in school building planning and school finance are gathered together. During the Eighty-fourth Congress, it was proposed by the administration, in Senate Bill 968, that assistance to state school building authorities be one of the principal features of its program for solving the nation's school building needs. The compromise bill HR 7535, known as the Kelley bill, also contains this feature. This has added to the growing interest in this method of financing new school construction.

Is it sound or unsound? Is it a safe or dangerous method in the long run? Will schools cost more or less by this method? Will schools be better planned or poorly planned? Does or does not the method violate time-honored and experience-tested principles of school administration?

These and many other questions are raised and require answers. We certainly cannot give unchallengeable answers to all of these questions. We will attempt, however, to discuss the conditions which brought about the authority plan, the nature and status of the plans in different states and the advantages and disadvantages involved.

The conditions which caused the development of the authority plan are headed, first of all, by the great need for school buildings. This need is more than apparent, but for evidence regarding it, the reader is referred to the reports of the National School Facilities Survey and to the transcripts of hearings on school construction bills before the Eighty-fourth and previous Congresses. The need for more schools has been brought about by:

1. A virtual holiday in school construction during the depression years of 1930–40 and the years of World War II. During this period buildings grew

Carl Julien

In South Carolina the school building authority raises funds through state bonds. A new school in that state is the Millbrook Elementary School in North Aiken, designed by Willis Irvin, architect.

old, became more obsolete and unsafe. From this factor alone a tremendous backlog of needs piled up.

2. During the same period populations shifted and increased, thereby placing more demands on the school systems in some areas.
3. Since World War II there has been a continued high birth rate.

Our Shifting Population

The lack of sufficient school facilities is by no means uniform. There are areas where the general population has been declining. Here the need is for replacement rather than expansion. In some cities, with city and school district boundaries remaining fixed, there have been little or no general population increases. Such school population growth as does exist in these cities is due to the higher birth rate or greater holding power of the areas. Many of these city school districts are well able to finance needed construction on a pay-as-you-go basis by authorizing a relatively slight raise in tax rates on real property.

It is in the "fringe" areas around large cities that the problem is most acute. Here the population has grown rapidly as houses have been constructed, and is mainly composed of young couples of childbearing age. It is in such locations that the ability to finance new construction from property taxes is quite low. It is in these areas, also, that large housing developments occur.

The home building business has changed greatly in the past few years. Whereas formerly a person might buy a lot and arrange with a contractor to build his house, now the situation is changed. Construction companies acquire a large tract of land, subdivide it, and build a large number of houses on a mass production basis. It is not uncommon for from 300 to 1,500 houses to be constructed in one school district as one project.

Sometimes whole new communities are developed in what had once been open country. Often the schools in these districts are already overcrowded, and the district has perhaps already bonded itself to capacity. However, there must be school buildings ready for the children from these houses once they are occupied. The buildings must be planned, financed and constructed before the valuation of the houses gets on the tax rolls.

The Inability to Finance

Along with the tremendous increase in need for school buildings has occurred a relatively sharp decrease in the ability of school districts to finance new construction. Let us see what happened to certain indexes in the decade from 1940–50. During that decade, incomes of individuals increased 296 percent. Corporate profits increased 441 percent before taxes and 355 percent after taxes. Costs of all types of construction increased 215 percent.*

The financing of school building construction still depends largely upon taxes on real and personal property. During this same decade of 1940–50, the assessed valuation of real and personal property increased far less than the other indexes. But this is not the whole story. During depression years constitutional and statutory limitations on tax rates were adopted in many states and low bonding limits were imposed, thereby further limiting the financial ability of the school district.

So, although the people nearly everywhere have shown a willingness to support schools and to approve bond issues by comfortable majorities, the school district finds its ability to attack its total problem restricted and reduced at the very time when needs are greatest. This condition is widespread enough to constitute a national crisis.

The Solutions Adopted

In practically every state where such problems exist attempts have been made to find a solution by one

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* Business Statistics, Biennial Edition, Supplement to *Survey of Current Business*, U.S. Dept. of Commerce, 1953 Edition. Construction figures, page 37; other figures, page 6.

means or another. Solutions adopted by the states have fallen roughly into three categories—namely:

1. Easing of constitutional or statutory restrictions involving tax rate limitations and/or bonding limitations, and improvement of assessment practices.
2. Provision of state aid for school construction or debt service in the form of loans or grants, or both.
3. Creation of school building authorities.

Some state solutions have involved combinations of two of these plans. For example, in November, 1948, the people of the State of Michigan modified a restrictive constitutional provision which practically prevented passage of bond issues. In April, 1955, at another state election this constitutional restriction was repealed insofar as 25–30 year bonds are concerned. At the same time, state money was provided for loans to school districts to assist them in making payments on bond issues in certain instances. The legislature, in passing implementing statutes for this constitutional amendment, has also repealed the debt limit of a school district for certain "qualified" bond issues.

A recent Supreme Court ruling, that the state equalized valuation is the legal valuation of a school district, has further improved the situation. These matters are cited as an illustration rather than as a comprehensive solution.

A critical look at the entire range of solutions leads one to the conviction that many of them have been adopted opportunistically without coming to grips with the basic weaknesses which have brought about the conditions. Some of these basic weaknesses are:

Unduly restrictive tax rate limitations and bonding and debt service limitations. There appears to be a general reluctance to attack these limitations and to ask the people to ease them. However, they were originally made by human beings and it might be supposed that intelligent human beings would modify them when their effect upon the education of school children is demonstrated, even though some powerful interest groups might be opposed.

Unrealistic property assessment practices. If real estate is to be a major source of support for local, county and/or state government in general, and for the financing of school buildings in particular, it seems obvious that it should be assessed realistically and equitably whether it be industrial, resort or residential property. Here again, powerful interests and traditions are represented, but improvement is not impossible and is of basic importance.

Outmoded Organization

Outmoded school district organization, resulting in an inadequate tax base. School people do not need to be told how difficult and complex this problem is. But it is a basic weakness in our system; a holdover from the days of eight grade education. Now, almost all children go to high school. Yet, in a large portion of the country, much of the property served by a high school does not share in the capital outlay or debt service cost for that school.

It is also obvious that school districts of a proper size will make possible sounder long term planning. But some of the solutions adopted to relieve the school building shortage dodge this issue entirely, and some even tend to perpetuate the status quo.

Battle Creek Enquirer and News

In November, 1948, the people of the State of Michigan modified a restrictive constitutional provision which practically prevented passage of bond issues. In April, 1955, this restriction was repealed insofar as 25-30 year bonds are concerned, and the children of the state are assured of some new facilities, if not all that are needed.

Hart Studio

Needed classroom space has been provided in Indiana with the erection of new schools like the South Elementary School in Nappanee. The architect is Alves D. O'Keefe. Local authorities are permitted in Indiana in addition to the state authority.

Probably such weaknesses in the attack on the problem are to be expected. The need is here and now, and the attack on these basic elements would take time. It is always easier to attack a problem directly and find a quick solution than it is to go behind the problem to the basic conditions causing it and to attempt to correct those conditions.

It is in this climate that the School Building Authority Plan has been developed.

Present Status of the Authority Plan

In an attempt to solve their acute schoolhousing problems and to overcome the effects of some of the restrictive conditions under which school buildings had to be financed, a number of states have adopted one or more special programs for financing the construction of public school buildings. In the spring of 1955, 28 states were providing school building assistance through grants-in-aid, loans, school building authorities or a combination of these methods.

At that time, six states had established some type of school building authority. In addition, Kentucky, a state which provided capital outlay grants-in-aid, also made it possible for local units of government to construct buildings for a school district on a lease-purchase agreement.

The Organization of the Authority

The organization of the school building authority differs in the six states utilizing this plan, but, in general, an independent state commission has been established to administer the program. Local authorities are also authorized in Pennsylvania and Indiana in addition to the state authority.

In North Dakota, the state school building authority is administered by the Department of Public Instruction rather than by a separate commission. In two states, Indiana and Maine, the state authority is not issuing bonds, as this is written, because of certain constitutional questions which have arisen.

Source of Funds

Except in North Dakota, where funds are provided by state appropriation, the school building authorities obtain their funds through the sale of bonds. In most cases these bonds are obligations of the authority and do not pledge the "full faith and credit" of the state.

Bonds issued to obtain funds for the authority in South Carolina, however, are state bonds. In Georgia, the authority bonds are revenue bonds, pledging as security the assignments of annual allotments of state capital outlay funds made to school systems of the state.

Operation of the Authority

In general, school buildings constructed with authority funds are planned by the local school district with the assistance of the state educational agency. Ordinarily, the local district will make application for additional schoolhousing, employ the architect, develop building plans and let contracts. The state educational agency will approve the need and the plans, and the school building authority will pay the bills and collect the rentals.

In most cases there is close liaison between the state school building authority and the state educational agency, since the chief state school officer is a member of the authority. In North Dakota, the authority is administered by the state department of public instruction; in Pennsylvania, the school building authorities cannot contract with the local school district until the state educational agency has certified its approval; and in South Carolina, the school planning

division of the state educational agency was transferred to the building authority.

During 1954–55, 1,000 school districts in Pennsylvania were financing school building construction through the various school building authorities, state and local, and between January, 1950, and November, 1954, more than 80 percent of all school construction in that state was financed in this manner. During the first two years in which the Georgia authority was in operation, 309 buildings were constructed at a total expenditure of $165,000,000.

Annual Rental Payments

Most of the authorities recapture the funds used to construct buildings in the local school districts through a system of annual rental payments. The period during which the loan may be repaid varies between 20 and 40 years, and in most cases the amount to be repaid by the local district includes principal, interest and the administrative costs of the authority.

North Dakota and South Carolina do not assess the cost of administration against the local district, and in South Carolina, Georgia and Pennsylvania, local districts are assisted in meeting annual rental payments through state capital outlay funds allotted to each district in the state. Once the loan has been repaid, the buildings are ordinarily deeded to the school district.

Advantages of the Authority Plan

The obvious advantage of the authority plan is that it provides a quick solution to the problem of providing school buildings for children. It is only necessary to prove the need, and to show that the district will have the funds from local revenue, state aid or both, to make the annual lease-purchase payments.

This is particularly important in the district which, because of large housing developments, faces a tremendous increase in enrollment but does not as yet have the tax base to finance buildings for the children living in these houses. There will be increases in tax revenues as the houses are placed on the tax rolls and state aid, if based on membership or attendance, will increase as the child population increases.

Another advantage of this method is that it provides a way of financing buildings *for schools* without attacking debt limits and tax rate limits which apply to all units of local government.

Another feature, which may in some instances be an advantage, is that the school building authority is one step removed from the other problems of state school administration, and may be able to take a stronger stand on some issues than can the regularly established state educational agency. For example, the authority may be better able to say "no" to applications for construction of two or three small high schools in neighboring communities when one adequate sized high school would provide a better program. Or it may be able to deny applications unless adequate school district organization has been accomplished through merger of the service area of a community into one school district.

In one state at least, the school building authority has been a means of accomplishing rather quickly a program of school district organization. However, this advantage, if it is one, is not inherent in the authority plan. It might be a part of any overall plan for financing school construction.

Disadvantages of the Authority Plan

The principal disadvantage of the school authority plan is that it sets up a dual system of school adminis-

In Michigan some easing of the pressure for needed school facilities was granted when the legislature repealed the debt limit of a school district for certain qualified bond issues. In the meantime, teachers and children make the most of available facilities.

Battle Creek Enquirer and News

tration. True, there may be coordination with the state department of education as described earlier, but it is still a dual system, and the possibilities, if not the probabilities, of the evils of dual administration creeping in are always present. The authority plan really says that the education of children is one thing and the providing of school buildings is another.

One great strength in the American system of education is that it is not highly centralized and mechanized by a "ministry of education." In states making the most significant progress in education it is a basic state policy that the local community assume responsibility for its own educational program, and that it design that program to fit its needs.

It is an established principle that the school building should be designed to fit the program. A state agency which constructs buildings and retains title to them is very likely to have more to say than it should about the planning of that building. It may force the community, in the name of "standards," to include rooms or features which it does not want, or it may prevent the community and its architect from being as free as they should be to develop new designs.

Any scheme for financing buildings ought to be one that will encourage better design. Progress occurs in a climate of freedom when the community, its school staff and its architect can dream about the kind of education desired and the best kind of building to house it.

A system whereby one agency apart from the community builds a school and another operates it, unless administered with exceptional vision and intelligence, will tend to induce a climate for planning quite the opposite of the one which will make for progressively better design. This may come about in the name of economy, or minimum standards or some other rationale. The above is intended to point out a danger believed to be inherent in the authority plan rather than as a criticism of the present operating policies of the plan in any particular state.

Another Disadvantage of the Plan

Another disadvantage of the authority plan, which was discussed somewhat in earlier sections of this article, is that it dodges issues. A tax limitation or a debt limitation, or both, prevents needed school construction. So, instead of attacking these issues directly, a device or a superstructure is adopted to get around them. If these limitations are unsound and harmful they will continue to be such whether an authority plan is adopted or not. The adoption of the authority plan will only serve to postpone the day when these issues must be faced.

The basic problems of financing local government in general, and schools in particular, should be faced head-on. The total problem should be studied objectively and sound measures proposed and adopted, rather than devising superimposed solutions.

Collecting the Rent

Another question which might be raised regarding the authority plan is that of annual rental payments. The issue is whether or not, in some instances, the money for these payments will come from funds which should be used for the operating program. The same question could be raised, of course, regarding annual payments on bond issues. The point is that there ought to be adequate safeguards to prevent using operating funds in either case. Such safeguards will differ from state to state, depending upon forms of state aid, and laws regarding local tax levies.

One can be quite sure, however, that the state school building authority will be certain, when it contracts with a district, that it will be able to collect its annual payments. In fact, it must be sure of this if it is to remain solvent and if its own securities are to be marketable. Should not there be an equal safeguard that funds needed for instruction cannot be used for "rent" payments?

If the bonds from which the school building authority obtains its funds do not carry the "full faith and credit" of the state, they will carry a higher rate of interest than will state bonds or sound local bonds. This means, of course, that the authority must collect higher annual payments from its "tenants." The final result is a higher total cost of the school building. This weakness is by no means basic and is open to correction.

Each State Must Act

Each state, on the basis of its needs, its wealth, its existing framework for school administration and its peculiar prejudices and customs, must decide how it will solve its school building problem. It is to be hoped that each proposed solution will be examined carefully in regard to its long term soundness and its agreement with sound principles of school administration. Will it weaken or strengthen local initiative, local interest and local responsibility? Even with critical needs and pressures for quick solutions, the basic principles must not be overlooked. Stop-gap emergency solutions too often tend to become permanent.

EMERGENCY MEASURES FOR PRIVATE FINANCING OF NEW SCHOOLS

by DOUGLAS HASKELL

Editor, Architectural FORUM, New York City

Douglas Haskell has been an editor and author on architectural and building subjects for thirty years. His first article advocating modern architecture was in 1925, and his first staff job on an architectural magazine was in 1929. From the beginning schools have been his subject of closest study. The two school reference issues of his present magazine in 1949 and 1953 are still Mr. Haskell's proudest journalistic achievement. The first earmarked the so-called "Haskell-Novicki" plan for small compact loft-type schools; and the second promoted a major school "Economy Forum."

PRIVATE financing of public school buildings sounds anomalous and is anomalous. Attempts at private financing have arisen under a variety of special circumstances. Signs are that the necessity for such financing will diminish, but the circumstances that bring it about are worth understanding.

Complications May Develop

Public credit is based upon the solvency of a community. When the situation is right, public credit is very secure and has the lowest interest rates. In spite of this, the process of financing new school buildings may develop many complications.

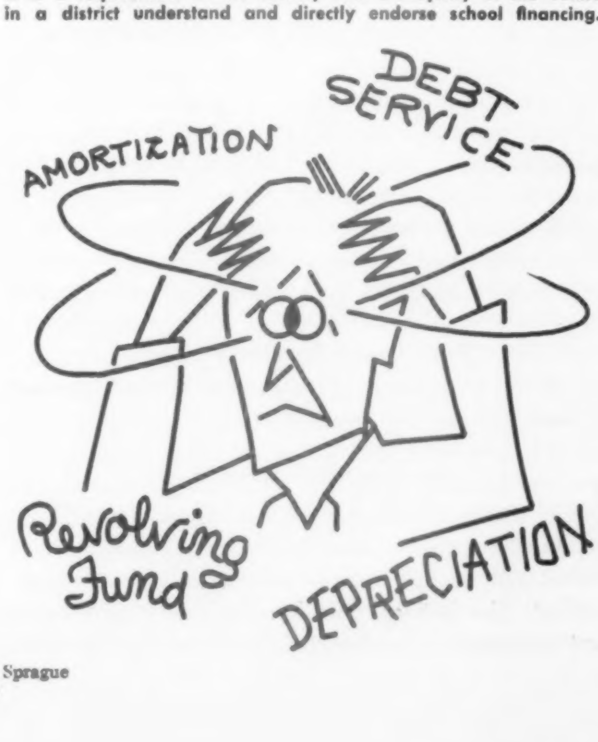
Most of these arise in connection with the requirement in the United States which demands that school financing be understood and endorsed directly by the district voters, who must participate if our school systems are to be vital and sound. In short, the voters must approve school bond issues.

When the People Vote "No"

Now, suppose that a community is torpid and has lost its old-fashioned American rectitude toward its children. The people can vote against a school bond issue. If this happens, the distressed school board will attempt to gain the community's approval, and may even be tempted to look for means of financing other than school bonds.

As a worried California school superintendent and his architect told us recently, "Three years ago a school bond issue was passed 6-1. The next was passed 3-1. It looks as if we might now miss getting 2-1 (needed for passage) and a horrible precedent may start." They were frankly looking for some emergency measure which would provide the needed facilities until the people could be brought to approve the bonds. For

It is a requirement in our country that a majority of the voters in a district understand and directly endorse school financing.



Sprague

dilemmas like this, private financing may seem to be a possible solution.

The School Authority Plan

Many a community has problems in financing new school buildings. To help poor communities the state may form an "authority" as a private corporation, using the tax resources of school districts throughout the state as security in selling its own bonds. The poor community will enjoy sharing the credit of wealthier ones, all grouped together in the authority. But these authorities may be private corporations run by business men. The district no longer constructs its own school. The authority finances the construction and the community may acquire the building gradually by "lease-purchase." By this method the school is paid for with rentals and is owned by the local district after some twenty years. There is always the danger that the authority, which holds the purse-strings, may use its influence to determine what kind of schools the children will get.

In another instance, a community may have spent a large sum in the past for new schools with extensive investments in other improvements. It will, therefore, be dangerously close to its limit of permissible bonded indebtedness, set by state law. Although such a community may be thoroughly education-minded, it is literally at a standstill as far as additional capital outlays are concerned. It has to look for ways either of getting its bonded indebtedness limit raised—a slow process involving all other communities of the state—or it may be tempted to try to circumvent the restriction.

Bases of Bonded Debt Limits

This situation is further complicated by the fact that bonded debt limits are based on real estate assessments. If assessments are high, corresponding closely to real market values, the debt limit is also high, but the community penalizes itself in other ways. For example, it cuts any share it may have in state aid, compared to other communities that keep their assessments low. New York State has led the way in attempting to set fair bases for limiting bonded indebtedness. In New York aid is based not on assessments but on real property values, estimated by methods that are scientific.

The "Lease-Purchase" Plan

Until such rectifications are made, the distressed community may be forced to look for other ways to provide needed facilities. Let us briefly examine the private financing expedient of "lease-purchase." The gist of this method is that a school district "buys" with its rental payments. Monthly or yearly payments must be set high enough to retire the capital expenditure involved. The builder, who has the school as security until payments are completed, has done the borrowing and must cover the interest *he* pays. In commercial circles this financing expedient is quite common and is the backbone of the FHA process by which millions buy their homes.

The "Lease-Purchase" Procedure

In the lease-purchase procedure, as applied to schools, school boards will attempt to budget the rental as a current fund expenditure. Where the state legal department refuses to allow such acquisitions through lease-purchase, on the grounds that they are really capital outlay and are not legal except under the bonding

A big housing development in a community means an influx of many new school children. Circumstances may develop where the school becomes the counter piece in a game involving the school district and private interests as well. Chief among the private interests will be the builder of the housing development.

process, the situation may become even more involved.

Take the example of a school superintendent in California. For a school administration facility costing $400,000 he went to a builder and arranged for a "build-lease" deal which was not even a lease-purchase arrangement. After a year of legal negotiations, the total building cost was set at 1½ percent more than the rate of amortization for the same amount in school bonds. Said the happy builder, "The advantage is that a school district can have needed facilities without elections, without school bonds and without cash outlay." Unfortunately, the district does not own the facility after paying more than school bonds would have cost.

Renting a School

Another California district rents an entire school for $1,000 a month, but does not own it and will never own the building under California law. The *Los Angeles Times* told the story:

Prefabricated school buildings are one answer to the problem of providing schools for the children in a new housing development. Builders can offer such schools cheaply to the community to help offset the problems created by the arrival of the new homes.

"The owner claims he intended it to be an office building," relates the superintendent, "but to look at it you'd swear he built it to be a school. But I don't ask questions. I just renew the lease every three years the way the book says and bring on the kids. No, I wouldn't buy the place at half the price. By renting the school, it doesn't count against us in our state bond allocation."

California's Legislature did pass a bill to make lease-purchase construction arrangements legal. However, when the State Education Department objected because poorer districts would not be helped, the governor gave the bill a pocket veto.

There is another set of circumstances where a school becomes the counter piece in a game involving not only school districts but private interests as well. Chief among these interests are the builders of large housing developments. Some of them offer to finance schools and are motivated by an honest attempt to aid school districts which are faced with a sudden influx of new students. A big housing development brings in a great number of new children, without providing correspondingly assessable values, as would be represented by new industrial plants. Many towns, sensing the coming burden on their schools, tend to zone against such housing developments and otherwise discourage them.

The Builder Tries to Help

To overcome this obstacle, the builder tries to help the town to obtain the needed new schools. He may offer his highly efficient prefabricated techniques for building the schools, as Levitt did in Levittown, Pennsylvania, and then give a lease-purchase arrangement to the school district. Habitually a salesman, the builder rarely understates the savings to be obtained. He emphasizes that he will get all the information he can from the school board so that the building will meet its needs. The community is tided over until industrial establishments are able to follow the new housing to town, thereby providing enough taxable values, or until some other way is derived for the schools to be financed with school bond issues.

Philip Klutznick, chairman of American Community Builders, has taken a broad view of the whole problem. He says that in starting his new community at Park Forest, Illinois, he realized he must temporarily engage in "the school business." He hoped that eventually public authorities would be able to take over.

For the first families in the town (which now has a population of 25,000) the builder paid tuition for children attending school in adjoining districts. Later the builder's staff, in close association with the local school board, went into a "subsidized" temporary program. A non-profit school foundation was incorporated. The first school facilities provided by the foundation consisted of houses especially designed to serve for the moment as schools and were located on spacious sites. Other schools were designed for the foundation by architects appointed by the school board. These buildings were subject to referendum, on the expectation that after eighteen months the school board would have the bonding power to assume ownership of the schools.

Five Schools Are Provided

Five schools came into being in this way, giving the children proper facilities from the very beginning. Approximately 1.5 million dollars were allocated by the builder to finance the school foundation, $700,000 of which is still outstanding. Because the next program

of 1,200 homes, according to joint studies of the builder and the school board—will leave a gap of $200 per home between the fiscal needs of the school district and its foreseeable bonding power, the builder has done two things. He has agreed to a private loan for the building program, and he has given an outright grant of $225 for each home completed in the area.

Mr. Klutznick admits that his ultimate purpose has not been purely a matter of charity. The sale of his houses is helped tremendously when he is able to show that a real school is nearby. No less is the school district helped to have schools ready to operate when needed. It is the homeowner who, under the theory of business profit, really pays the $225 per house represented by the grant. There are less responsible builders, of course, who are apt to ignore the fact that schools are part of the legitimate cost of any house, just as roads and sewers are.

Prefabricated Schools

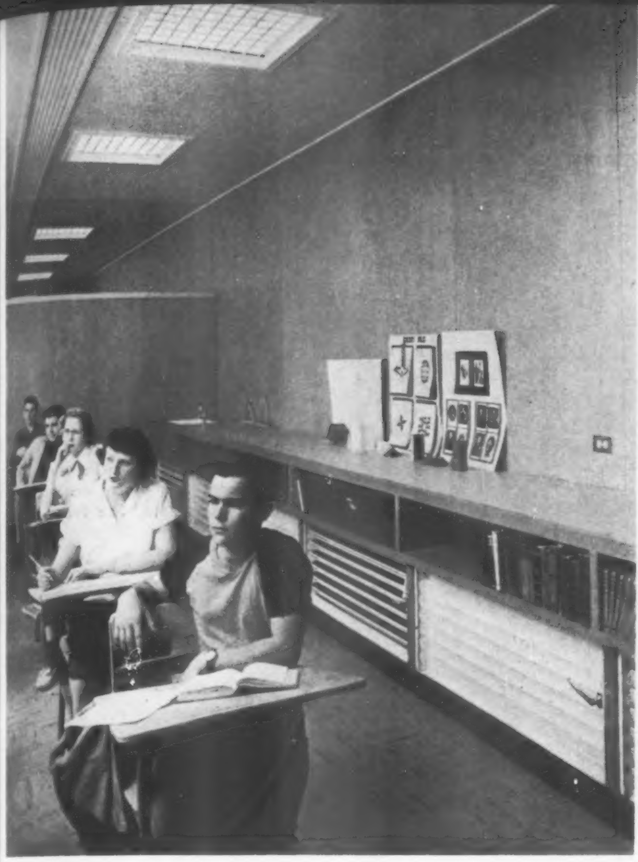
Another approach to industry participation is that by Jim Price of National Homes. Mr. Price offers to builders schools which are prefabricated to reduce the cost per room. Builders can offer them to the community cheaply as amelioration of the problems their new homes bring to the school district. Mr. Price says he intends to work out no lease-purchase arrangements himself. His is the problem of designing a school which will be acceptable to varying building codes and which will also be worthy of the name of a top-ranking prefabricator.

Any attempt at the private financing of new school buildings represents an emergency measure which, it is hoped, will only be temporary. When school people must turn to lease-purchase arrangements to circumvent complicated or over-restrictive bond issue procedures, it is time to examine our bonding procedures.

What Is the Answer?

The answer to the lack of capital outlay funds to provide enough school facilities may lie somewhere in the fact that school taxation is tied exclusively to real estate taxation. State and Federal aid measures may be needed. In the meantime, there is no letup in the influx of additional students to the public schools, and emergency measures will, of necessity, have to give way to a sound capital outlay program.

There is yet no end in sight to the problem of too many students and not enough classroom space. Emergency measures for financing new school buildings must eventually be replaced by definite and sound programs.



This is a top lighted classroom in the Guymon, Oklahoma, High School. Architects are Caudill, Rowlett, Scott and Associates of Bryan, Texas, and Oklahoma City. Ulric Meisel-Dallas

Top lighting brightens the kindergarten coat storage area in the Henry B. Milnes Elementary School in Fair Lawn, New Jersey. The architect is Arthur Rigolo, Clifton, New Jersey. Ben Schnall

TOP LIGHTING IS HERE TO STAY

by DONALD BARTHELME

AIA, Architect, Donald Barthelme and Associates, Houston, Texas

Donald Barthelme has a B.Arch. degree from the University of Pennsylvania and received the Arthur Spayd Brook Medal in design. He received post-college training in Philadelphia, Dallas and Houston, and established his architectural practice in Galveston in 1935 and in Houston in 1939. Designs by Mr. Barthelme have received awards in five local, state, national and international competitions. Most of his school buildings have received awards or citations.

ARCHITECTS have another tool in their kit as they pursue a constant quest for new answers to the lighting of school buildings. Top lighting has progressed beyond early experimentation to a place of real importance in the scheme of natural daylighting.

Forty architectural firms have supplied information concerning top lighting in schools designed by them from 1951 through 1955, and for schools under construction or in the planning stage. Of these forty firms, only twelve have indicated that none of their school buildings for the years 1951–1955 have any top lighting at all.

The remaining twenty-eight firms reveal that they have designed a total of 415 school buildings from 1951 through 1955, 83 schools are under construction and 46 are in the planning stage.

Of the 415 schools built during 1951–1955, 60 percent were toplighted wholly, partially or in some special way. Of the 83 schools under construction, 58 percent have been toplighted wholly, partially or in some special way. Fifty-seven percent of the schools being planned will have some form of top lighting.

Architects' opinions on top lighting ranged from one firm which replied, "all our schools are toplighted, either wholly or in part—over a hundred of them," to the architect who observed that he "preferred the use of lanterns."

A careful study of the negative replies, however,

Roger Sturtevant

Hand-operated louvers control the toplighting device in the Brittan Acres School by architect John Lyon Reid, San Francisco, California.

Ulric Meisel-Dallas

The corridor of the Wilson Elementary School, Miami, Oklahoma, is made bright with top lighting. Caudill, Rowlett, Scott and Associates, architects, Bryan, Texas, and Oklahoma City, Oklahoma.

reveals that their authors had in general never used a toplighting device and seemed to have either a distinct aversion for the method or a feeling that artificial light made such efforts unnecessary.

The architects indicated that top light was first introduced into corridors and service areas. Recent examples, however, include all the spaces in the school plant without exception. It is the classroom, that fundamental teaching space, which receives the attention of the toplight designer, and for obvious reasons. This is the space that separates the men from the boys in the design of a teaching environment and if the tool is useful at all, it is most useful here.

Advantages of the System

The admitted advantages of a non-directional source, with attendant flexibility in seating and space use, the freedom in planning provided by release from lighting orientation requirements, combining with the obvious psychological advantages of utilizing natural daylight and the pleasant natural environment invoked, were often pointed out. No architectural firm

reported downright failure or dissatisfaction with top lighting, but perhaps such a source would not seek public notice.

Architects indicated that the following areas in school buildings designed by them have been top-lighted in whole or in part:

Administrative areas	Kindergartens
All major spaces	Kitchens
Art rooms	Laboratories
Circulation areas	Libraries
Classrooms	Lobbies
Corridors	Locker rooms
Covered play areas	Service areas
Dressing rooms	Shops
Gymnasiums	Stairways
Instructional areas	Toilets

The Methods Employed

Queried as to the methods used to top light these areas, the architects indicated that the plastic skydome, with its cost advantage over glass block, was the device most frequently employed. The standard skylight was, nevertheless, a very close second in point of number of installations and its adherents strongly defended their choice. In all, a variety of methods was listed. Among these were: plastic skydomes, directional glass block, three-way monitor, straight monitor, partial skylights, custom-made skydomes, skylights, skylights and corrugated plastic ridge skylights, glass block skylights and plastic domes, flat skylights with exterior louvers, plastic luminous ceiling, clerestories, wireglass and corrugated plastic skylights.

Reactions of School Personnel

What is the school personnel evaluation of top lighting in school building areas? The architects reported the reactions of school personnel with enthusiasm and were uniform in recording general acceptance and approval of top lighting. One firm states, ". . . good except the *all* glass roof job. There one teacher said too dark on a cloudy day while our foot-candle meter was reading 85 F.C.! Another said *too* bright on a clear day when meter read 115 F.C. There was no variation across the room."

Other typical comments by school personnel were:

"Very satisfactory."

"Most of them love it. A few complain of the heat transmission."

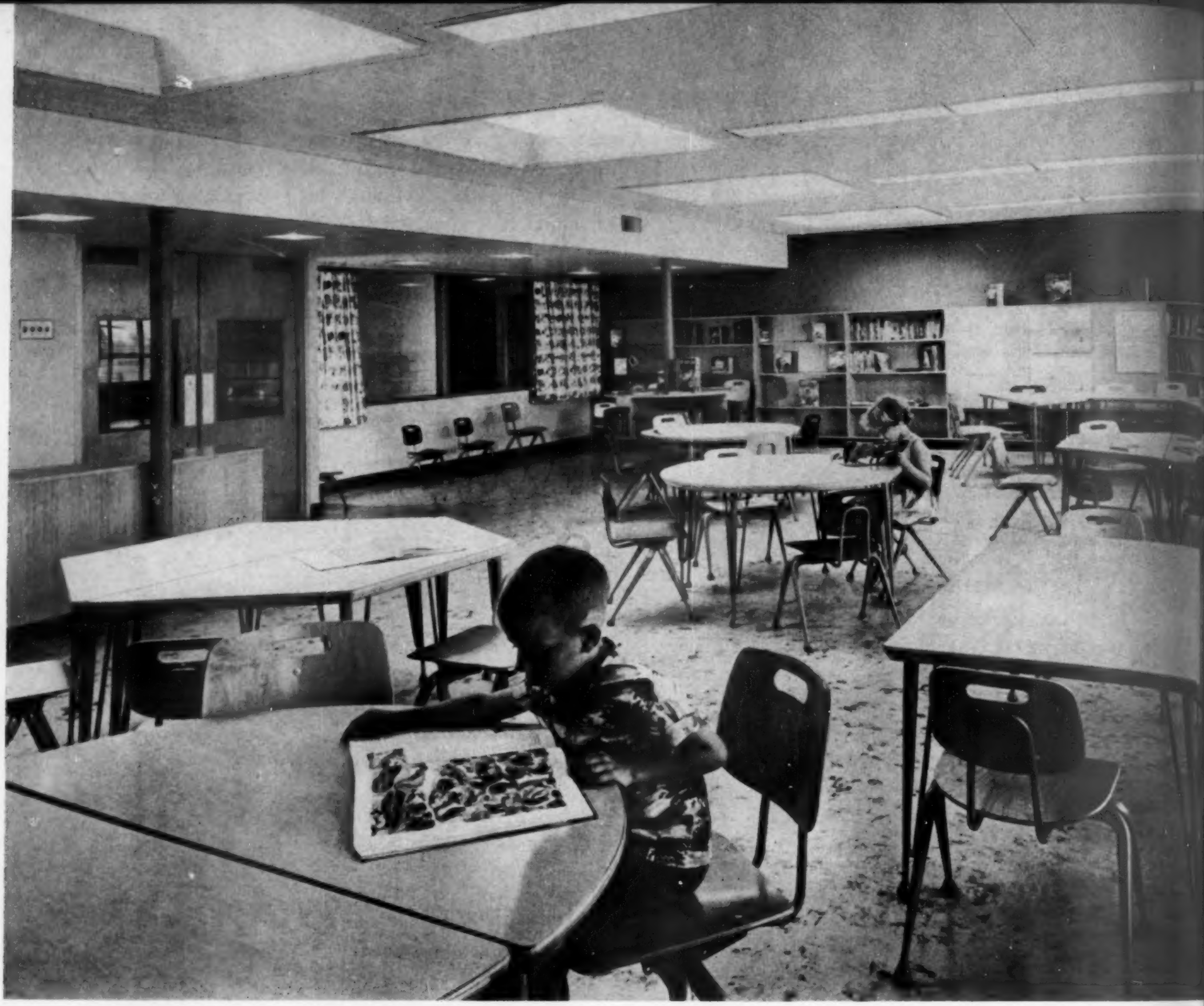
"Excited and skeptical."

"Good teaching environment."

"Happy. Increasing use of visual education equipment had, however, necessitated adding means for darkening underneath top lights in many rooms."

There is an eight-foot ceiling in the kindergarten of the Salem Avenue Elementary School designed by McLeod and Ferrara, architects of Washington, D.C. Top lighting is supplemented by fluorescent fixtures.

Fred J. Maroon



The combination of top lighting and fluorescent fixtures is continued in the library of the Salem Avenue School, Hagerstown, Maryland. The architects are McLeod and Ferrara of Washington, D.C.

"Good, except for control of blackout blinds."

"All school personnel concerned have found skylights satisfactory."

"O.K. No objections."

"Well accepted—all districts which have had one school of this type built and occupied have wanted this design repeated in future schools. Some districts have as many as five of the clerestory type."

For the most part, then, school personnel seem very pleased with top lighting, although some instances of heat gain or room darkening problems have been cited.

What the Architects Say

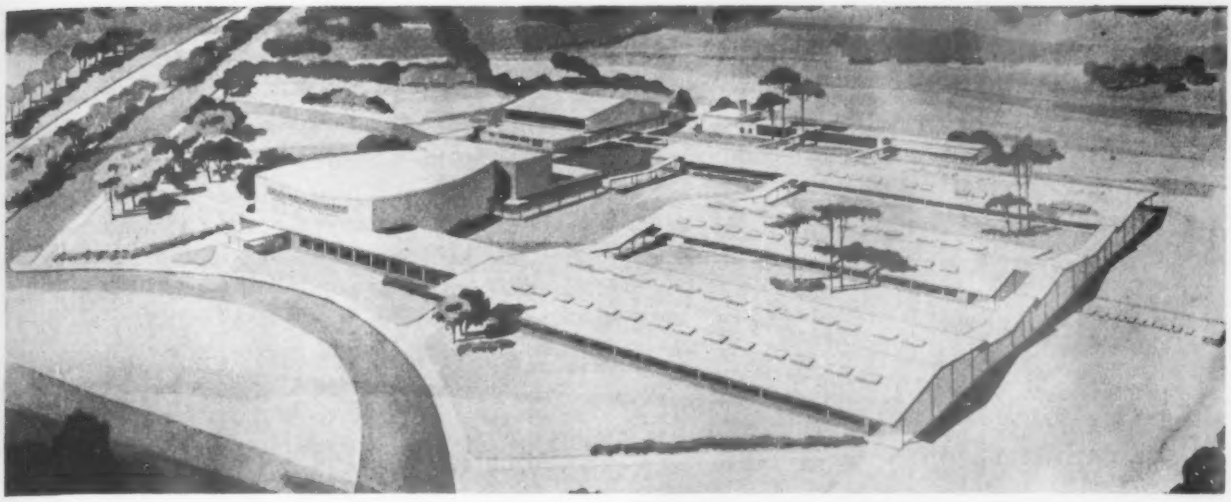
How do the architects, themselves, rate top lighting and the methods and results achieved? Most of them modestly contented themselves with expressing a satisfaction with the improved lighting pattern resulting from their techniques. One obvious difficulty with the high level lighting developed by the top source was its interference with projection equipment and low brightness screens. Blackout blinds were the usual counter answer.

There is considerable experimenting going on among the advocates of the different methods and sources of top lighting. Some architects ruefully admitted that their earlier attempts were accompanied by too much light and too much heat; others relaxed only when they found that their systems worked; there were a few who readily conceded that their presently chosen methods are only temporary while they hunt for ever better solutions.

Many architects indicated that the costs involved were a small factor and in most experiences have been found to be reasonable. Maintenance costs, too, were described as low or practically non-existent.

Here are various comments on methods evaluation, costs and maintenance:

"Skylights cost less when large areas are involved. No maintenance except vandalism. Skylights or skydomes disturb the layman less than do monitors. The benefits of top lighting justify the cost when funds are



Double rows of skylights provide top lighting for the classroom wings of the Lufkin High School in Lufkin, Texas. The architect of this secondary school is Wilbur Kent, AIA, of the same city.

available. Full skylighting is probably most economic for results attained. We use a lower translucent ceiling under glass skylights or plastic skydomes for diffusion, heat insulation and prevention of condensation."

"Well Worth the Cost"

"Top lighting is well worth the cost. It pays its own way in terms of the freedom it can give the school planner. While not maintenance-free, it has not created serious problems. We found our glass skylights to be too hot. Plastic eggcrate louvers do not stand the heat and become brittle, but these are problems of materials and should not negate the soundness of the technique. Our present methods will do while we search for better ones."

"In our first school we used too much top light (eight bubbles) in the library for sunny spring days. All other experience—good."

"We used this method to create a pleasant natural light environment but still are willing to depend on artificial sources to level out foot-candle readings."

"Plastic domes would be all right in corridors or places where spots of sunlight on the floor did not affect studying or learning tasks. Some method of shielding or diffusing would be helpful where top light is used in learning situations. The cost is greater than

Julius Shulman

Wired glass skylights provide daylight for the elementary demonstration classroom at the University of California, Los Angeles. Architects are Richard J. Neutra and Robert E. Alexander of Los Angeles.

Ulric Meisel-Dallas

Translucent plastic skydomes dot the roofs of sections of the Lamar Junior High School in Laredo, Texas. Caudill, Rowlett, Scott and Associates, Bryan, Texas, and Oklahoma City, Oklahoma, are the architects of the building.

artificial lighting fixtures to accomplish a similar result. Maintenance is not a serious problem compared to lighting fixtures except in locations where atmosphere is laden with dust or soot."

"Reasonable cost. No maintenance problems except blackout blinds. Plastic domes with adjustable metal louvers have also worked out very well for us. Top lighting cuts cubage, improves the scale and shape of a room over the clerestory system, simplifies framing, flashing, etc. Plastic domes are simpler to install than glass block. Rooms 30 feet by 30 feet may have an 8-foot height with pleasant space. Frosted ceiling domes under clear roof domes seem to be best."

"Error in Using Clear Plastic"

"Error made in using clear plastic. Question in this climate (Minnesota) is what skydomes do that artificial lighting can't do as well, more cheaply and with less possibility of maintenance difficulties."

"Some leaks in early 1948 examples through expansion of metal gutters."

"Our main reason for using top lighting is to provide double-loaded classroom wings with the same amount of light as bilaterally lighted single-loaded classroom wings. This results in a more compact building and consequent reduction in initial cost. This makes cross ventilation a little more difficult to solve, but we believe our solution will be adequate in this regard."

"More decorative than practical. The problem in this locale is one of excluding the light, not inducing it. With ample fenestration on both sides of the classroom and obscure glazing for a portion, center-of-room top lighting is of questionable value, creates more problems than it solves."

"Natural lighting can *never* be totally effective because of dark weather in this area. Therefore, as long as artificial illumination is to be provided we believe it to be a better solution to install *good* artificial lighting and cut down on natural lighting to control both light and temperature due to heat loss or gain. Use of visual aids reinforces this point. We have used some roof openings for accent and openness but do not feel it to be a good source of illumination."

"Top lighting is an answer to certain plan functions, but we do not feel it is proper to design with top lighting as a required part of the program."

"Excellent Daylight Effect"

"A luminous ceiling provides an excellent, evenly distributed, soft daylight effect of the proper intensity. It is competitive with other good systems in regard to cost. Maintenance is no problem."

"Roof surface lighting has its place in modern construction."

A Firm Analyzes Its Methods

The analysis which follows was submitted by one of the firms which graciously undertook to supply information for this study:

Top light brightens the corridor entrance to the multi-purpose room of Lyncrest Elementary School, Fair Lawn, New Jersey. Arthur Rigolo, Clifton, New Jersey, is the architect.

Ben Schnall

"In 1951 our firm had barely enough courage to top light, by means of skylights, only large spaces, such as gymnasiums, shops, etc., that could not be lighted well by any other means. In addition to this, it was our normal practice in 1951 to use top lighting in the form of clerestory windows at the third point of the span facing either north or south as dictated by the plan. When the clerestory windows were oriented south, sunlight was controlled by exterior louvers.

"The development of aluminum bar skylights which was pioneered in this area (California) provided an economical and simple method of top lighting which encouraged a much wider use of top lighting in our office. These were much easier to build and cheaper than clerestory windows. The skylight was glazed with blue tinted glass which was frosted to reduce glare.

"We have designed many jobs where this kind of top lighting has been made use of to provide a partial light to supplement daylighting from window sources. In 1951 we were using these skylights on a few schools because we were rather well satisfied in 40 to 60 percent of our schools. We use this type of skylight for elementary school classrooms, gymnasiums, shops, laboratories, corridors and, in general, for almost every educational space.

"There are problems in connection with this type of overhead light. There is a heat problem which is particularly noticeable when the ceiling is low; supplementary controls are needed in the form of egg-crates or louvers—adjustable louvers on the interior or exterior, or a screen which is installed on the exterior. The advantage of a light control installed on the exterior of the skylight is that solar heat is intercepted before it reaches the interior.

"We have found that top lighting provides real

Louvered top lights provide daylight for the work counters in classrooms of the Lamar Junior High School, Laredo, Texas. Architects are Caudill, Rowlett, Scott and Associates.

Ulric Meisel-Dallas

Inner areas in the classroom of the Tuckahoe Elementary school, Arlington, Virginia, have a combination of daylight and artificial lighting for illumination. McLeod and Ferrara, Washington, D.C., are the architects of the building.

Fred J. Maroon

Philip Fein

A louvered clerestory is a feature of this classroom in the Los Cerritos Elementary School, South San Francisco School District, California. John Lyon Reid and Partners, architects.

advantages in visual aid controls since there are many devices available which will exclude daylight that comes through skylights. One of the best of these we have found is the crank-operated adjustable louver. The use of top lighting also allows us to reduce ceiling heights.

"One of our newest high schools provides the most desirable answer to the problem of top lighting. For the first time in our experience we have used top lighting as the sole source of light. The installation is Kimball glass block. The school is now nearing completion and we have been quite pleased with the results to date.

"It is my opinion, however, that although the aluminum bar skylight may be cheaper, controls must be provided to make its light quality comparable to overall top lighting with Kimball glass block. The cost of aluminum bar skylights with controls almost equals the Kimball glass block installation."

Pioneers in Top Lighting

Top lighting, then, has many design and use advantages which architects are employing and experimenting with in their search for good lighting techniques for school buildings. Considering the pressures, economic and political, that pursue these designers, and thinking of the consequences of failure in terms of prestige and future jobs, it is a credit to the architectural profession and a great benefit to education that these men undertake this probing into new answers at all.

Buckley

Jones Photo Co.

Wall panels of the Quinault Lake School, Amanda Park, Washington, are scored in four-foot sections. This was done by using inserts in the forms. The building site of 28 acres is recently logged-off timberland.

TILT-UP CONSTRUCTION FOR THE QUINAULT LAKE SCHOOL

by CHARLES A. BAYLON

AIA, Charles A. Baylon & Associates, Architects, Seattle, Washington

Mr. Baylon has specialized in school design since World War II. His work emphasizes audio-visual design and function. He received his architectural education at the University of Idaho. He attained the rank of major in the Corps of Engineers during the war and served overseas in an engineering and design capacity. Mr. Baylon's studies of construction problems and effects of adverse weather on buildings have influenced his development of tilt-up concrete design for schools.

THE Quinault Lake School District in Amanda Park, Washington, is typical of many small school districts having limited finances but extensive requirements for educational buildings in permanent, fire-resistant construction. Amanda Park is a small community, located adjacent to the Olympic National Park on the shores of Lake Quinault. It is situated 170 miles west of Seattle, completely off main transportation routes or any railroad lines.

The weather consists of comparatively mild temperatures with approximately 140 inches of rainfall per year, on the average. The sole industry of the area is logging and lumbering.

The decision to construct a reinforced concrete school in a forest area may cause some measure of surprise. The school directors spent approximately one year's time investigating all types of school construction and a wide variety of designs. As a result of this comprehensive study, they concluded that the proper approach was to construct a permanent type building within the limited budget; a building that would be reasonable to maintain and structurally sound for resistance to seismic forces and severe coastal storms.

The basic structure decided upon included tilt-up reinforced concrete exterior walls and interior corridor walls. The tilt-up technique of construction was selected for its wide economies, proved on many industrial buildings. The educational program required a combination high school-elementary school with centralized administrative functions. This combination building would reduce custodial problems and simplify and economize the school operation.

The building site is recently logged-off timberland and consists of twenty-eight acres, eventually to be de-

The 28 acre site for the combination school in Amanda Park had to be cleared of timber before work could begin on the school.

veloped into a comprehensive plan with complete facilities for the school. Total facilities to be provided, in addition to the school buildings, include residences for the superintendent and principal, a school bus garage, a covered play area and play fields for elementary and high school pupils.

History of Tilt-up Construction

For a better understanding of tilt-up construction, it seems desirable to review the basic principles. Tilt-up is a special form of precast concrete construction. It is usually limited to construction in which walls are cast at the site in a horizontal position on the floor slab, tilted or lifted to the vertical position, set in place and made an integral part of the completed structure. Such construction is generally considered a new development because most of the buildings erected by this method have been built since 1946.

Actually, the method was used shortly after the turn of the century for a few housing developments and commercial buildings. An early example of commercial construction using tilt-up methods is a building in Des Moines, Iowa, built around 1906. Several buildings were erected, using this construction, for the army at Fort Crockett, Galveston, Texas, in about 1912.

The limited usage of tilt-up concrete construction prior to 1946 can be directly traced to economic considerations in the construction industry. In this type of building the amount of labor employed is a great deal less than in conventional construction. Lifting equipment, such as cranes, must be readily available for the actual erection. As a result, in periods when labor was very plentiful and cheap the tilt-up concrete method of construction did not flourish.

With the greatly increased wage scale in the construction industry after 1946 and the general acceptance of large machinery in the building industry, tilt-up concrete became an economical asset to the builder and had very excellent reasons for flourishing. In contrast with the assembly of intricate pieces of structural and finish material in completing a building, the principle of large pieces being erected rapidly and efficiently saves building dollars.

Avoiding Waste Lumber

In normal concrete construction, where form work is employed on both sides of a wall and additional scaffolding and runways are necessary for placement of the concrete, a great amount of lumber waste occurs. So long as lumber was plentiful and the industry had no particular concern for conservation, it was entirely logical to burn or discard used form lumber. With the high cost of labor it is cheaper to buy new material than to salvage form lumber for use in other work.

The floor slabs were finished first, enabling the forms for the wall panels to be fashioned in place on them. The wall forms are shown prior to pouring of the concrete.

A school district that is building a school must pay for any waste during construction, even though it is not finally utilized in the building. The combination of these factors readily shows the wisdom of getting more school building for the building dollar when tilt-up construction is used.

Design Is Important

There are many methods employed in the construction of tilt-up concrete buildings and these are dependent upon the design. Some serious mistakes have been made in school buildings employing tilt-up concrete. An example of this was a school recently completed which had sun canopies and other protrusions cast directly on the tilt-up panels. This caused a great deal of difficulty in placing the concrete in the forms and also in erection. So much extra work was involved in handling these details that no money was saved over a conventional concrete structure.

The philosophy of building design must be in harmony with the method of construction in order to create an efficient structure that is well designed for the end use. Most tilt-up buildings are one story in height, although there are some that are multi-story. The latter generally have been constructed by tilting the walls for each individual story. In some instances, walls two stories in height have been cast and tilted as a unit. The weight of such panels is the limiting factor regarding the size that can be erected.

Procedures of Construction

In the Quinault Lake School, the entire design was worked out from the standpoint of economy in construction and ease of erection to assure maximum savings. The floor slab was placed directly on grade. The keyways were cast to receive the outside concrete tilt-up panels as well as the interior corridor wall panels. No separate footing forms were required in the design, thus eliminating considerable labor and materials.

After the floor slab had been placed it was carefully steel troweled to a smooth, hard finish. Curing compound applied over the slab helped secure a perfect curing job. After the slab had sufficiently hardened to prevent damage by workmen, all of the wall panels, including interior corridor walls, were laid out on the floor slab.

The end walls, used as lateral bracings, are 7½ inches thick, which permits enough reinforcing steel and steel pipe columns to be imbedded directly in the wall. Reinforcement and imbedded steel pipe columns were designed to take any stresses encountered in lifting the wall panels and also to resist stresses in the final building structure. The forms required consisted of 2 inches by 8 inches finished lumber placed directly on the slab to outline the shape of the wall panel.

The interior corridor wall panels are designed to act as a stiffening diaphragm for longitudinal forces and form the interior wall of the classroom. Again, pipe columns were cast directly in these panels in order to resist forces encountered in lifting the panels. These wall panels are 3⅝ inches in thickness.

The total amount of form work required for the walls, then, was a 2-inch by 4-inch member outlining the shape of the panel and forming any openings for doors. Again, reinforcing steel was placed inside the forms to properly reinforce the panel. The integral pipe columns were placed when the reinforcing steel was laid in the forms. Reinforcing steel was welded directly to these pipe columns to develop proper strength for the loads to be imposed.

The low spandrel walls under the outside fenestration followed the same procedure as the interior corridor walls. Pipe columns were cast as an integral part of these panels with reinforcing steel welded to the columns. In this manner, when the panels were erected and plumbed, the structural system was in place and ready for roof application.

In the construction procedure, after forms have

The wall panels have been poured and the forms are stripped prior to erection. Reinforcing steel and steel pipe columns project from the edges of the panels.

been placed for the panels and before any reinforcing steel is added, the entire floor area occupied by the panel is sprayed with a "parting" compound. The function of this parting compound is to prevent the concrete placed in the forms from bonding to the concrete floor slab. Material so used must offer no tension or resistance in lifting the panel.

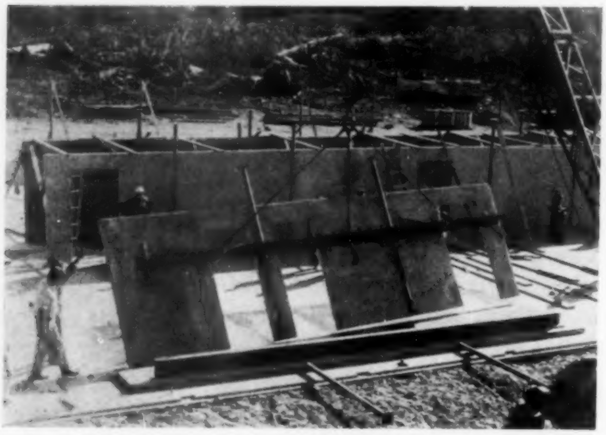
Bond Breaking Agents

In early examples of tilt-up construction, a wide variety of improvised bond breaking agent was used. As the need became apparent many building supply companies developed and marketed parting compounds that do an outstanding job. Following the application of the parting compound, reinforcing steel is placed within the forms. Holes are drilled through the edge form of each panel to allow steel to project beyond and be welded to the adjoining panel steel.

After the steel is in place, the pipe columns are very carefully installed and welded to the reinforcing steel. A small amount of form work and no scaffolding are necessary for this phase of construction.

Placing the Concrete

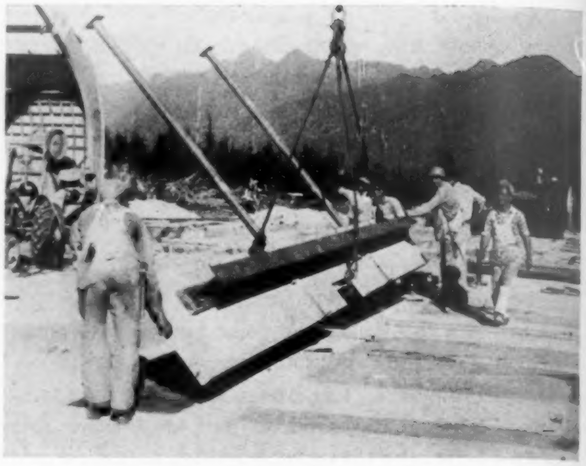
A considerable advantage is gained in the placement of concrete. Either a transit mix truck or a cement mixer on the job can quickly and easily discharge the



The interior corridor wall panels are being lifted into position.

total batch or load directly into the form. This eliminates the painstaking process of wheeling and hoisting concrete and its careful placement within the forms. The forms are filled with plastic concrete mix and "vibrated" to insure complete and proper filling and elimination of any air pockets or other voids.

Great care must be exercised to avoid placing the vibrator between the screen of reinforcing steel and the floor slab. If this is done, it results in elimination of the parting compound from the original concrete slab, and the wall panel bonds to the floor slab. After the concrete is properly vibrated, the wall panel is screeded flat and troweled to a smooth, even finish.



A crane is used to lift the spandrel wall panels for positioning.

Walls that form the outside of the Quinault Lake School building were cast with the outside surface uppermost. After the steel troweling had been completed, a very fine brush finish was applied, running the strokes vertically on the wall. This gave a fine texture to the wall surface. This particular procedure increases the wearing life of the exterior walls of the building. The walls receive a very dense, fine surface finish which is similar to a reinforced concrete highway.

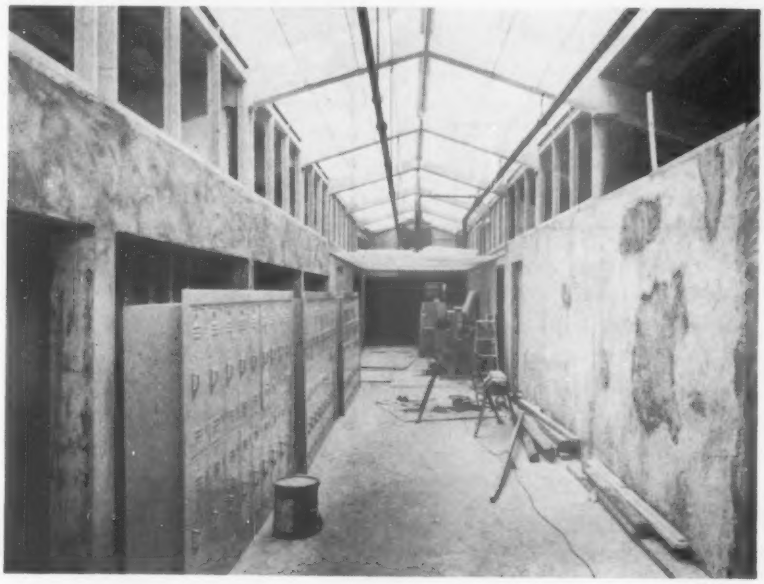
The Finished Wall Panel

The addition of neat cement and careful troweling brings the fines to the surface and results in a hard and impervious finish for the wall panel. This surface finish will outlast most other building materials and can be treated with color to present a permanent and beautiful surface.

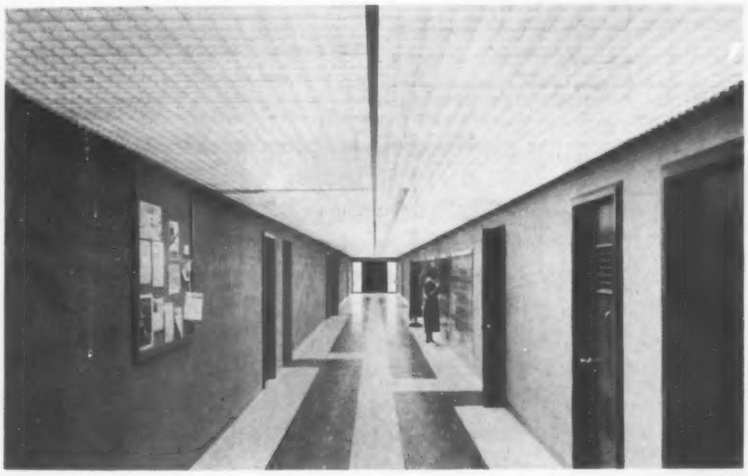
The interior wall panels were steel troweled on the uppermost side to a smooth, even finish. These panels, after being erected, do not receive plaster or other work but are complete as they are with the exception of painting.

The design of the concrete mix for this building was based on a strength of 2,500 lbs. per square inch. The concrete was mixed on the site because no plant-mixed concrete was available. Native gravel was utilized and mixing was carefully controlled with respect to the water-cement ratio. When the concrete was placed in the wall panels, test cylinders were also cast. At the end of seven days the cylinders were tested for strength and found to be sufficient for placing the panels. Forms were stripped around the edges of the panels and the area was made ready for maneuvering the rubber-tired cranes. The usual debris and form work that litters a job at this stage of construction were absent.

The overall design concept of tilt-up panels and the general design layout vary considerably from one job to another. Generally speaking, tilt-up wall panels



Interior corridor wall panels are ready for the final finish. Plastering or other treatment is unnecessary.



The completed corridor has vinyl asbestos tile floors and an eggcrate ceiling under the skylight. The concrete walls have no plaster finish or other covering.

are designed as flat slabs which must support the stresses imposed on lifting a panel into place. As a result, the typical tilt-up concrete wall construction becomes a minimum of six inches in thickness.

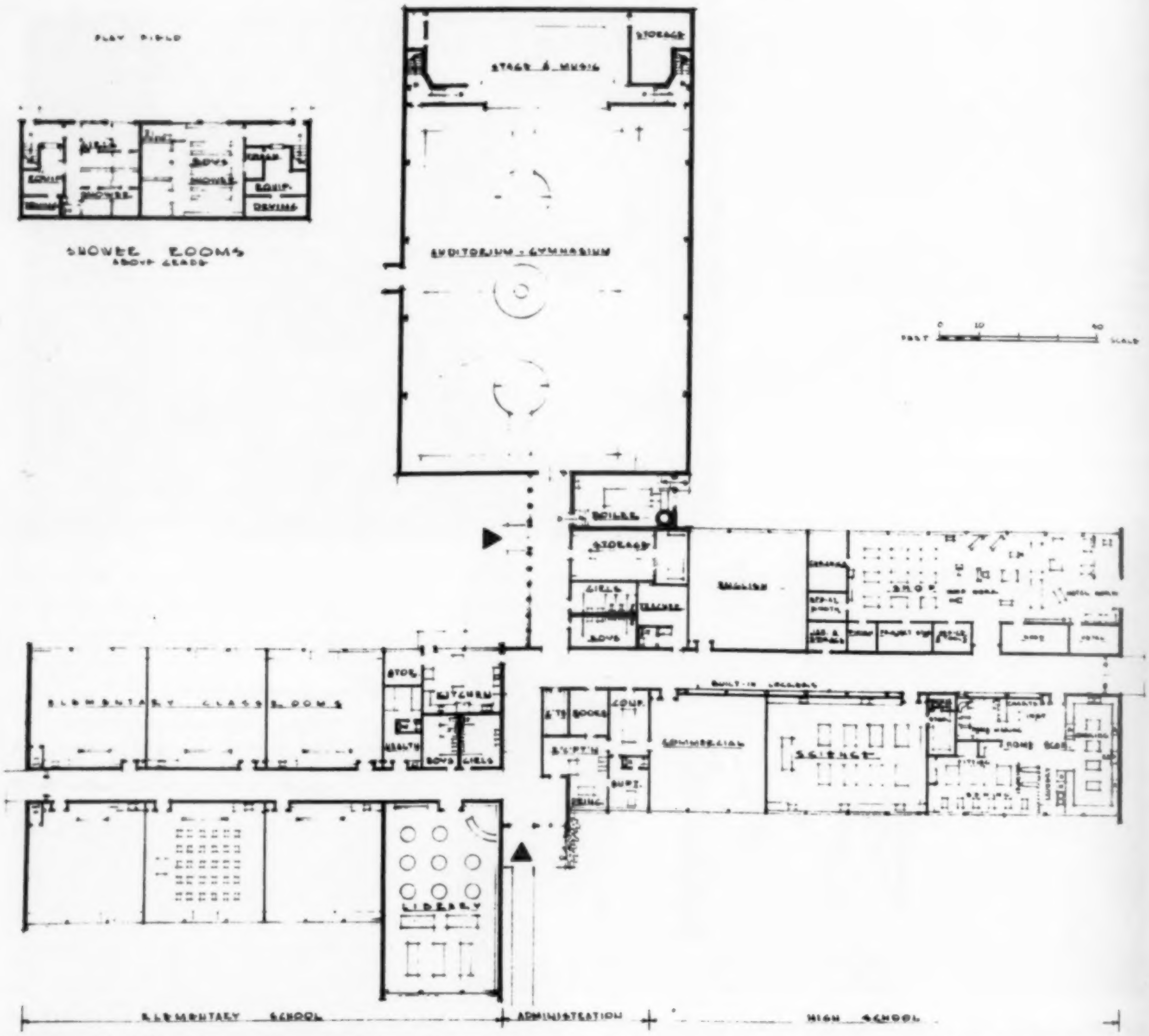
A Problem to Consider

In our investigation of construction techniques, we have found that the extra cost of concrete in isolated places, plus the factor of adding reinforcing steel to meet code requirements, increased the amount of labor and materials necessary for panel construction. In addition, it was found that one of the expensive problems, with regard to tilt-up walls for school construction, was in the casting of columns either integrally or separately from the wall. In a previous project we had worked out the design to use columns of reinforced concrete cast separately from panels. This is the construction that is usually employed.

After considering a wide variety of solutions, we arrived at an extremely economical and balanced design for wall panels. Instead of concrete and steel work placed to withstand stresses imposed by lifting the wall panels, we devised a composite type panel construction which was calculated to resist any lifting stresses imposed, and at the same time reduces the total amount of materials used. The structure used was dictated by the maximum span for 3-inch tongue and groove wood roof decking. For the type of roof loads imposed, it was found that the material could span a distance of ten feet and be entirely satisfactory. This dimension became the basic module around which the entire school was designed.

After a thorough analysis of the stresses and costs, we designed the corridor panels and spandrel panels under the exterior fenestration for a 3⅜-inch thickness. This reduced the amount of concrete by 40 percent and at the same time cut down the quantity of reinforcing steel needed to meet code requirements. Sufficient strength was achieved to provide diaphragmatic reinforcement for lateral bracing between the structural columns supporting the roof.

In order to avoid lifting stresses being applied against our comparatively thin wall panels, we utilized structural members that were poured as an integral



The Quinault Lake School accommodates both elementary and high school students. The administrative offices are located between the two divisions of the school. There are a combination auditorium-gymnasium, with shower rooms located above the grade, a library and a shop area. The English room is next to the shop area, with commercial, science and homemaking rooms nearby.

part of the wall panel. In our five-point pickup, we secured the I-beam lifting device to the panel by means of three "spiders" cast in the concrete at the midpoint of each ten-foot module. A tack weld was made directly to the structural steel column so that any lifting stresses would be absorbed by these members rather than by the thin concrete panel.

When a proper "parting compound" was utilized, we experienced no difficulty in lifting wall panels from the floor slab. The corridor wall panels were relatively easy to maneuver and set into proper position. The smaller spandrel wall panels, below the windows, were low and consequently light. These panels also were lifted into position by the five-point pickup method.

In all panel layouts reinforcing steel was placed to project beyond the edges of the panel. Panel designs were worked out to allow six inches of space between panels. In this way the reinforcing steel and other structural pipe columns could be welded into a unified whole. Wall panels were carefully plumbed, utilizing a special back stay with a turned-buckle arrangement which facilitated plumbing the wall.

When this plumbing operation was completed, reinforcing steel between panels was welded together to form a continuous structure. Plates on the bases of integral pipe columns were welded to additional plates in the floor slab. This gives a secure anchorage and resolves the structural elements into "vertical cantilevers" resisting lateral thrust.

The spaces between panels were then carefully cleaned and treated with a special bonding agent. Forms were placed to complete the wall and concrete was poured into the space. We again departed from typical concrete construction details in the completion

of the joint. Generally, it has been felt by other engineers that it is necessary to have all joints beveled to form V's. This was calculated to eliminate the possibility of cracks in the concrete.

In our process of investigation and previous construction, we found that it was not necessary to use a V-joint to eliminate the possibility of cracks, if proper bonding was used. As a result, we were successful in securing a perfect joint with no indication of the juncture after the wall was finished.

No Bolted Connections

In many details we were asked the reason for not using bolted connections. We have found, in our experience, that when bolts are used on a construction project where extremely wet weather conditions exist, there is the likelihood of rusting threads and other job spoilage. To avoid this, the design was worked out with the idea of utilizing welding to the fullest extent. Sufficient work was planned throughout the entire job to require a welder to be present during the erection.

Some unusual circumstances were encountered in the process of construction. In one area where large panels were necessary, sufficient floor slab space was not available to pour the panels individually. As a result, these very large panels were poured in a sandwich type construction in which a number of panels were placed on top of each other. Some of these panels weighed in excess of twenty-two tons.

A change in the listing schedule from the original plans then forced the contractor to remove several top panels to get to one of the lower panels for his sequence of erection. In this instance the panels were lifted, set on edge and braced while other panels were removed and erected. It may be noted that the large panel at the entry of the building was scored in four-foot sections. These panels were poured with the scored face down, inserts being placed in the bottom face of the wall panel. After the panels were erected the inserts were removed and the wall panel was finished.

The lifting technique employed is a relatively simple operation. The heavier panels required special precautions and a longer time to set in place. The Quinault Lake School structure was erected in three different operations. The elementary wing was lifted in the first operation, requiring approximately two days. Following this, the central portion, including the library and administrative section, required an additional two days because of the heavy panels, the pouring of large wall panels on top of each other and double handling. The final lifting sequence, involving all of the high school wing, was completed in one and one-half days.

When the wall panels were lifted, the crane also placed the gull wing beams atop the pipe columns. A crew of carpenters was then able to spike the tongue and groove roof decking to the beams, with the roofers following immediately in sequence. In this manner, on a well organized project, a school of approximately 30,000 square feet could readily be erected and roofed in slightly over one week's time. This speed of construction is extremely vital in instances where a short building season is available.

The lifting crane and operator do the work of a great many men in a very short period of time resulting in a saving of between 25 and 35 percent in the overall structural cost of the building. Again, it must be pointed out that this would apply only in cases where the proper concept of design was adhered to in the basic engineering of a tilt-up school building. It is unfortunate that many people, who do not have a full understanding of this type of construction, point out projects that have not worked out, without analyzing the reasons for lack of success in reducing the overall costs of construction.

The stage of the multi-purpose room also serves as a music room. This unit was not built with tilt-up concrete construction, but has 75-foot span, glue-laminated wood arches.

The home economics unit has facilities for cooking, sewing and homemaking instruction. The tackboard at the rear can be reversed for use as an audio-visual screen.

After the wall panels of the Quinault Lake School had been erected and the areas between panels were filled with concrete, the spaces in the channels at the base of the walls were packed and troweled with a cement grout to produce a uniformly smooth finish for the floor slab. Areas left open for welding the base plates of steel columns were grouted, closed and firmly and securely finished to match the surrounding wall area. By utilizing a proper bonding agent, no crack resulted at the joints.

Testing for Leaks

We found that the fire hose, turned against such joints, could not penetrate or show any moisture leaks through the wall after the job was completed. This was an extremely rigorous test but definite proof that the joint would perform as intended. Careful inspection of the wall panels, after they had been erected, was a testimony to the soundness of the approach in designing interior corridor walls as well as exterior walls for the precast tilt-up technique.

After concrete had been placed uniformly in the relatively thin wall panels, vibration was applied with a mechanical vibrator. As a result, we found no void in the concrete nor any air pockets or exposed gravel. The final finishing of the concrete, which is typical in a cast-in-place type of construction, was unnecessary. The scrubbing in of the cement grout and the sacking down of the surface to make a uniformly smooth texture were completely eliminated. It is evident that these concrete walls are completely free of imperfections and blemishes. The finished wall sections and the interior corridor indicate how well the reinforced concrete was finished.

It should be pointed out that the first portion of construction was performed by a firm of contractors who had never before undertaken a building with this type of construction. They experienced no difficulty and made rapid progress. The second phase of construction was completed by a contractor who had previously employed the tilt-up method of construction, although the details were different. In actual working time the second contractor far exceeded our expectations for completing this portion of the work.

Sun and Glare Control

The gull wing roof was developed to suit local conditions. There are very few days in the school year that are not totally overcast. In the early fall and the late spring a few weeks of sunshine are encountered and it is necessary to provide adequate sun and glare control. The remainder of the school year requires maximum utilization of the skydome to give proper daylighting within the school building. The generous overhang on the building was designed to prevent direct rays of the sun from shining into the classrooms until approximately the end of October.

This was accomplished by use of the roof overhang and a wide sun canopy over the vision strip. A space between the roof and the sun canopy was glazed with fiberglas laminate in a cheerful sunlight color. This material is a reinforced fiberglas plastic in corrugated form. In experiment we found that the winter sun, shining directly on this material, did not cause any more glare than did the light thin shades that had been used in other school buildings.

A pupil looking directly into the sun through this material would get a bright spot, but the children have not been disturbed or offended by this result. Generally, throughout the classroom an even diffusion of light was secured without the use of shades, and there are no shades in the school to block out daylight and add to the cost.

When the sky is overcast the yellow color of the

plastic material gives the effect of sunlight on the windows and produces a psychological effect on the pupils. The upsweep of the roof allows a higher space from the finished floor to the top of the fenestration, admitting more natural light from the dome of the sky.

On the corridor wall of the classroom, relights are installed above the plastic eggcrate corridor ceiling. The roof over the corridor is a continuous skylight of fiberglas laminated plastic. Baffles were provided to prevent direct rays of sunshine from entering any classroom and also to act as reflectors of light into the classroom. The continuous plastic eggcrate ceiling in the corridor allows light to flood the usually dark and drab corridor.

A small local power plant supplies the entire area with electricity and is subject to extreme overloads and frequent outages during winter months. It was highly desirable, consequently, that artificial corridor lighting be eliminated insofar as possible. We have found that there has not been any glare caused by direct sunlight through this skylight at any season of the year. The space between the plastic eggcrate and the skylight is used as a pipe chase for steam lines and electrical conduit, as well as an air exhaust plenum.

Finishing Details

The classroom ceilings are finished with long fiberglas which has a sound absorbing coefficient of .85. The material also acts as a thermal insulating treatment for the building. The ceiling installation alone resulted in a saving in excess of 55 cents per square foot of floor area. This material is now available with a vinyl plastic coating that gives a high light reflectance while retaining the original sound absorption coefficient. The ceiling is permanent and easy to clean. It reflects the type of multi-use materials that can, if properly utilized and executed, greatly reduce the cost of our school buildings today.

Vinyl-asbestos tile floors were installed throughout the building. The tile was laid in a broad stripe pattern that is helpful in arranging furniture or for organizing class activities. This type of floor exceeds in durability and appearance the typical floor tile that has been previously employed in schools in our area. It was felt that the additional cost was balanced by reduced maintenance.

Mechanical Details

Heating and ventilating were planned to give uniform temperature without drafts. A unit ventilator system is utilized in all classrooms. These units operate on a continuous cycle which gives perpetual air movement. The design of the roof and the automatic louvers situated over the classroom doors have resulted in a smooth, even flow of air throughout the school building without any drafts on pupils.

Large exhaust fans in the corridor exhaust hot air from above the eggcrate ceiling, thereby maintaining the proper amount of air changes throughout the building. The exhaust fans are controlled automatically. Warm stale air is forced into the corridor by the unit ventilators; when sunlight heats the area above the eggcrate to a temperature sufficiently high, the exhaust fans start the ventilating cycle.

Special attention was given in planning and design to audio-visual materials and techniques. Each classroom is equipped with an audio-visual screen that is an integral part of the building. These screens consist of a tackboard that is used as a teaching aid. When an audio-visual program is to be conducted by the teacher, she simply swings the screen around on its own axis and a 5-foot by 5-foot projecting surface is exposed in such a position that the ideal 60-degree cone embraces the entire class. A matte finish is applied to the screen and all pupils thereby receive the same light intensity during projection. Darkening draperies are installed on the outside windows and on the corridor relights.

The darkening draperies for the corridor relights are arranged to provide approximately two foot-candles of light during projection. It was found that pupils in a

Each of the classrooms has a built-in pivotal audio-visual screen.

totally darkened room are more difficult to control. The concept of full utilization of audio-visual films requires a session of a few minutes to perhaps a half hour in the class period. Therefore, the pupils must make comparatively rapid adjustments from darkness to daylight.

The versatility of the basic design of the Quinault Lake School is well illustrated by the high school home economics unit. The small size of the school made it necessary to have a combination unit which would include cooking, sewing and homemaking. These activities were combined and the area was divided to allow space for teaching large or small groups.

Multi-Purpose Unit

The multi-purpose unit that serves as a gymnasium, auditorium and music department was not built by means of tilt-up concrete construction. The unit was designed with 75-foot span, glue-laminated wood arches. Any unusual breaks in the roof construction were avoided to eliminate possible leaks and trouble

areas in flashing. The basic structure is comprised of glue-laminated wood arches. Wood purlins are set between the arches to give better connections and stronger lateral bracing than purlins set on top of the arches. The outside skin of the building is corrugated asbestos cement board especially treated to be waterproof. The inside finish is long fiberglas, left in its natural state and held mechanically in position.

The Cost Analysis

The following cost analysis is for the actual construction contracts. These figures do not include a separate water supply system that had to be provided to serve the building, or a sewage disposal system for sanitary facilities. Also, these figures do not reflect the cost of the site or its clearing, grading and landscaping. The costs do include:

Eight elementary grades & four high school grades, pupil capacity: 180 elementary, 150 high school. Cost, exclusive of land, furniture & fees	$343,632.00
Area in sq. ft. 31,976 ... cost per square foot	10.80
Cubic contents, 479,717 cu. ft. . . . cost per cubic foot	.71
330 pupils, cost per pupil	$ 1,041.31

Points to Remember

In conclusion, a number of very important points must be kept in mind in designing school buildings that employ the tilt-up method of construction. Any real economies that might be secured through construction are entirely dependent on the proper design approach. It is very important to:

1. Be certain that the school building is designed specifically for tilt-up construction, and not for the more conventional forms with a mere adaptation by the contractor. Most contractors are very good builders but are not equipped to design and engineer the structural and architectural details necessary to construct good tilt-up buildings.

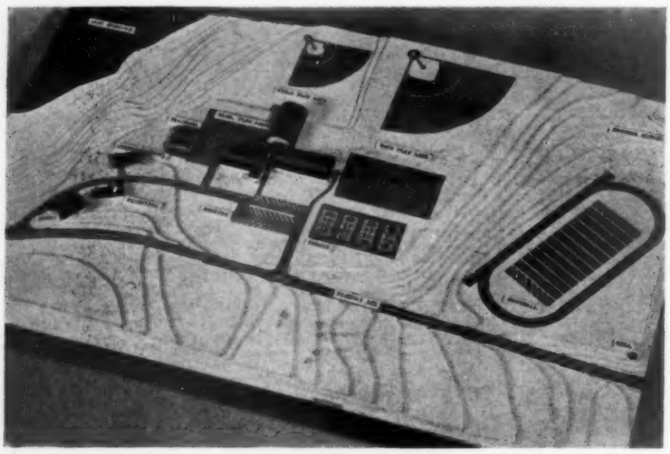
2. Take advantage of multi-use materials wherever possible in order that savings can be made in basic concepts without destroying the function of the building. A great number of these materials has been used in private industry and tested to great lengths for a variety of uses. Patience and careful investigation of many such materials will result in gratifying savings to the school district.

3. Integrate the design and function of the school building for maximum efficiency. Consider weather conditions and similar factors in the overall design.

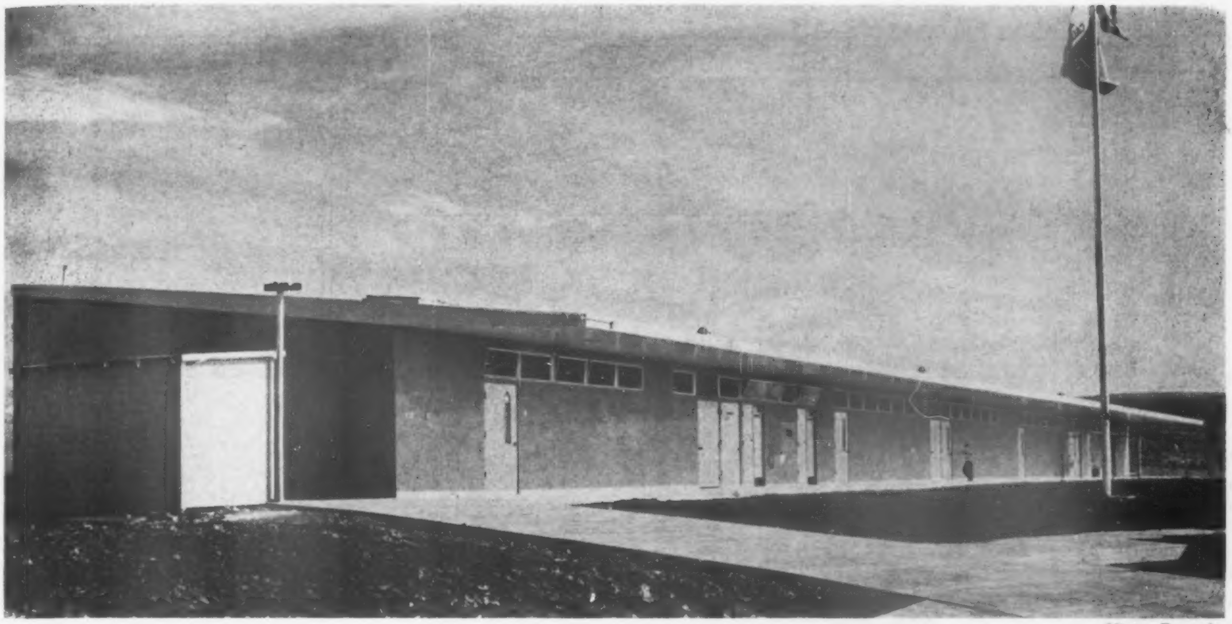
4. Utilize inexpensive devices to help in the teaching program, such as adequate audio-visual materials and details. The aspect of audio-visual instruction in classroom learning situations has been extremely impressive in schools that have built-in equipment for rapid and easy usage. Classrooms that can be converted in a matter of seconds to a perfect audio-visual situation are classrooms that become better instruments of teaching in the hands of a capable teacher.

Do not allow sentiment or custom to increase the cost of your school building for the sake of convention. Engineers and builders have spent thousands of man-hours working out excellent construction techniques that improve structural qualities of a building and at the same time reduce the overall cost.

Tilt-up buildings do not have to look like warehouses but can be designed to properly function as school buildings. Keep a flexible philosophy in mind during the formative stages of developing a school building program, and make use of maximum planning and the engineering techniques available to stretch your building dollar.



Total facilities provided at the Lake Quinault School include the school buildings, residences for the superintendent and the principal, a school bus garage, a covered play area and play fields for elementary and secondary school pupils.



Victor Barnaba

Wood and stucco construction was found to be economical for the Juan Cabrillo School.

COMPARATIVE COSTS OF STUCCO, STEEL AND CONCRETE CONSTRUCTION

by WILLIAM S. BRISCOE

Professor of Education, University of California at Los Angeles

Mr. Briscoe was formerly superintendent of Schools in Santa Monica, California, and before that was assistant superintendent in Oakland where he directed the building planning program. He has been a building consultant to many school districts.

and PIERRE CLAEYSSENS

AIA, Architect, Los Angeles, California

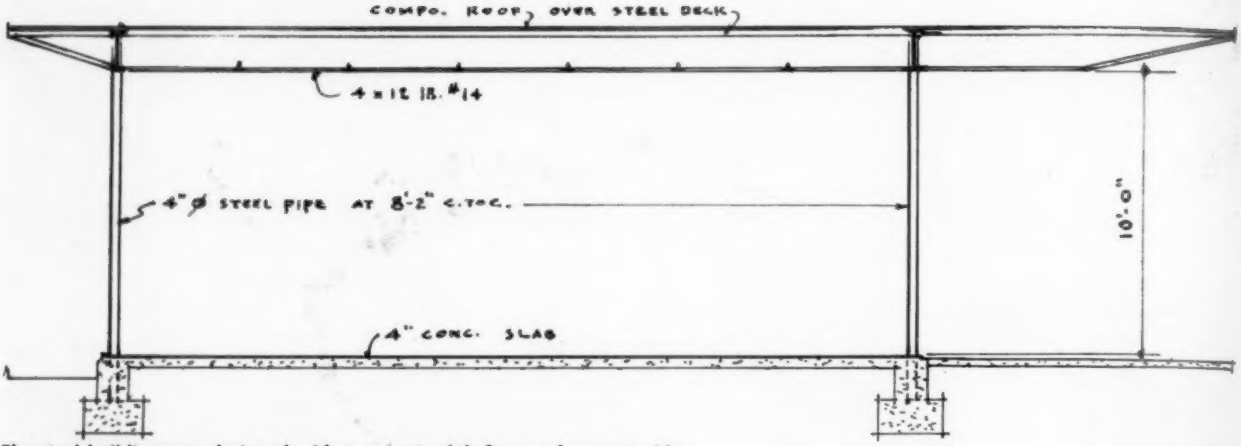
Mr. Claeyssens is a graduate of the Royal Academy, Antwerp, Belgium, with degrees in architecture and naval architecture. He has taken post graduate courses in architecture at the University of Southern California. His work is well known in Southern California.

DURING the planning period of the Juan Cabrillo Elementary School, which is in the Santa Monica Unified School District, the question arose, "Which would be the least costly to construct, a wood frame and stucco building, a steel building or a concrete building?" The proposed structure was to have four classrooms, plus a multi-purpose room, nurse's room, toilets, storage rooms and a principal's office. The area, including one-half the outside corridor, was to be 5,862 square feet.

The architect, Pierre Claeyssens, was persuaded to undertake to discover by experiment which would be cheaper: to construct the building of reinforced concrete, of steel or of wood and stucco. With the cooperation of his structural engineer, William Porush, and the Moduplan Steel Construction Company of Monrovia, California, Mr. Claeyssens prepared three different structural designs for the same building, one of wood and stucco, one of steel and one of reinforced concrete.

Reducing Costs Through Design

Special attention was given to reducing costs through design. The steel contractors, for example, were presented with a completely flat roof design so that all steel pipe columns could be the same length. A rein-



The steel building was designed with a concrete slab floor and a composition roof over a steel deck. The flat roof has an overhang to serve as a shelter for the outside corridor.

forced arched concrete shell roof and tilt-up concrete walls were determined to be the most economical for concrete construction. Two-by-four studs instead of two-by-sixes were permitted for wood-stucco construction and plywood was specified for roof sheathing and for shear walls. Interior plaster was omitted.

Consultations were held with contractors, who entered into the spirit of the experiment, offering valuable suggestions. Subsequent bidding indicated that they had accepted the challenge to keep costs as low as possible.

The Wood Frame and Stucco Design

The accompanying drawings show the three designs for which separate specifications were prepared. The wood frame and stucco specifications called for two-by-four studs, sixteen inches on center, and two-by-sixteen rafters, two feet on center. The roof was designed as a three-ply felt, mopped with hot asphalt, plus a ninety-five pound cap sheet painted with aluminum paint to reflect the sun's rays. The roofing material was placed over three-ply sheathing. The building was to rest upon a four-inch concrete slab with footings as indicated in the accompanying drawings. Floors for each design were to be asphalt tile. Cabinet work was also identical for each design.

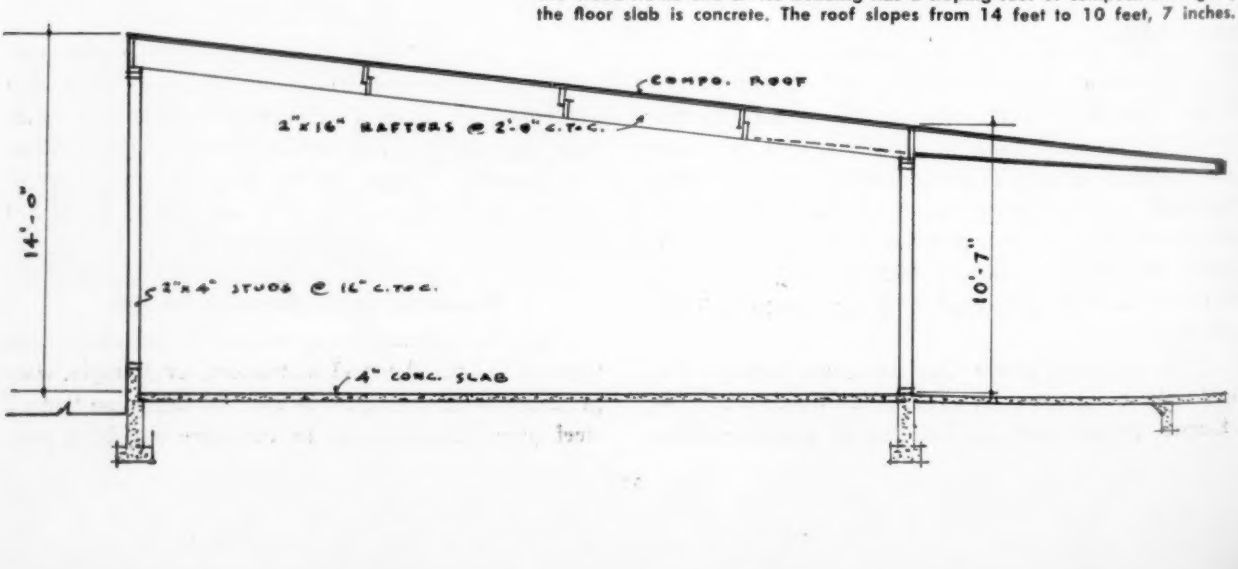
The Steel Building

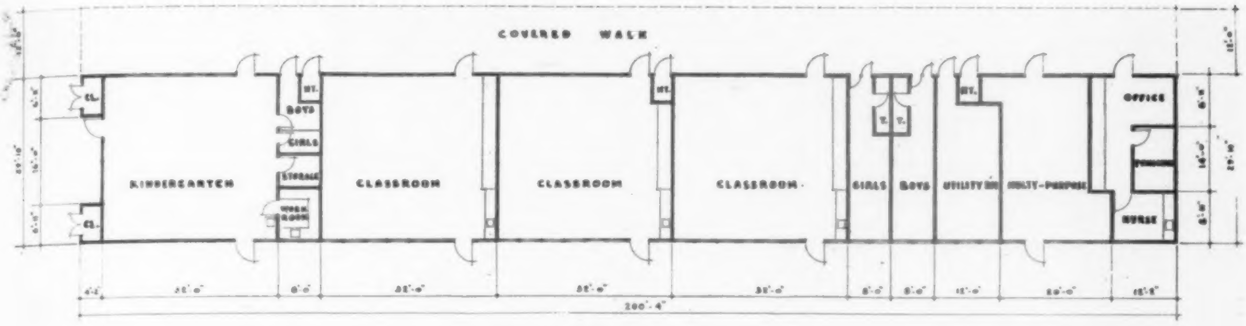
The steel building was designed for a flat roof with an overhang to serve as a shelter for the outside corridor. The roof decking was to be prefabricated to specification from channel forms supported by steel beams over four-inch pipes spaced eight feet, two inches on center. T-channels were welded to the bottom flange of the beams to form a support for four feet by four feet acoustical panels. Floor slab and foundation were similar to the wood frame-stucco design. Walls were specified to be of cemesto-asbestos, set in steel frames.

Concrete Construction

The concrete design called for a roof consisting of a three-and-one-half-inch arched concrete shell to be supported on the end walls of the classrooms, which rested on special footings. Outside walls were designed

The wood frame and stucco building has a sloping roof of composition. Again, the floor slab is concrete. The roof slopes from 14 feet to 10 feet, 7 inches.





FLOOR PLAN

The Juan Cabrillo Elementary School has 3 classrooms, a kindergarten and a multi-use room.

Victor Barnaba

Architect Pierre Claeyssens experimented to discover that wood and stucco construction was most economical for the Santa Monica school.

to be of tilt-up concrete construction. The outside corridor was also designed for a three-and-one-half-inch arched concrete shell with concrete posts at the ends of each classroom as outside supports.

Because of the nature of the soil, which is adobe, heavier foundations were required than for either the steel or wood frame-stucco designs.

Steel sash was specified in each design. Flooring, cabinet work, acoustic treatment, hardware, plumbing, electrical equipment, pinning board and chalkboard were exactly the same for each design. Radiant floor heating was to be accomplished by forced air through the floor slab. Except for the hung ceilings and extra footings in the reinforced concrete design, all details were similar for each plan.

The Bids Received

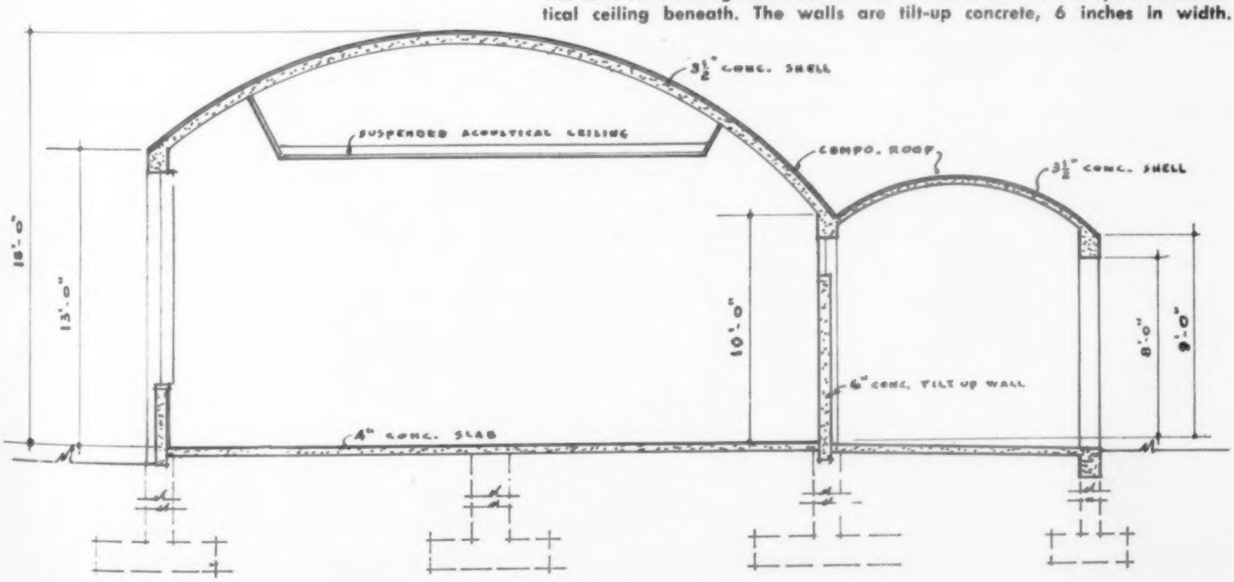
There were several bids received on each design. When these were opened in January, the low bids were tabulated as follows:

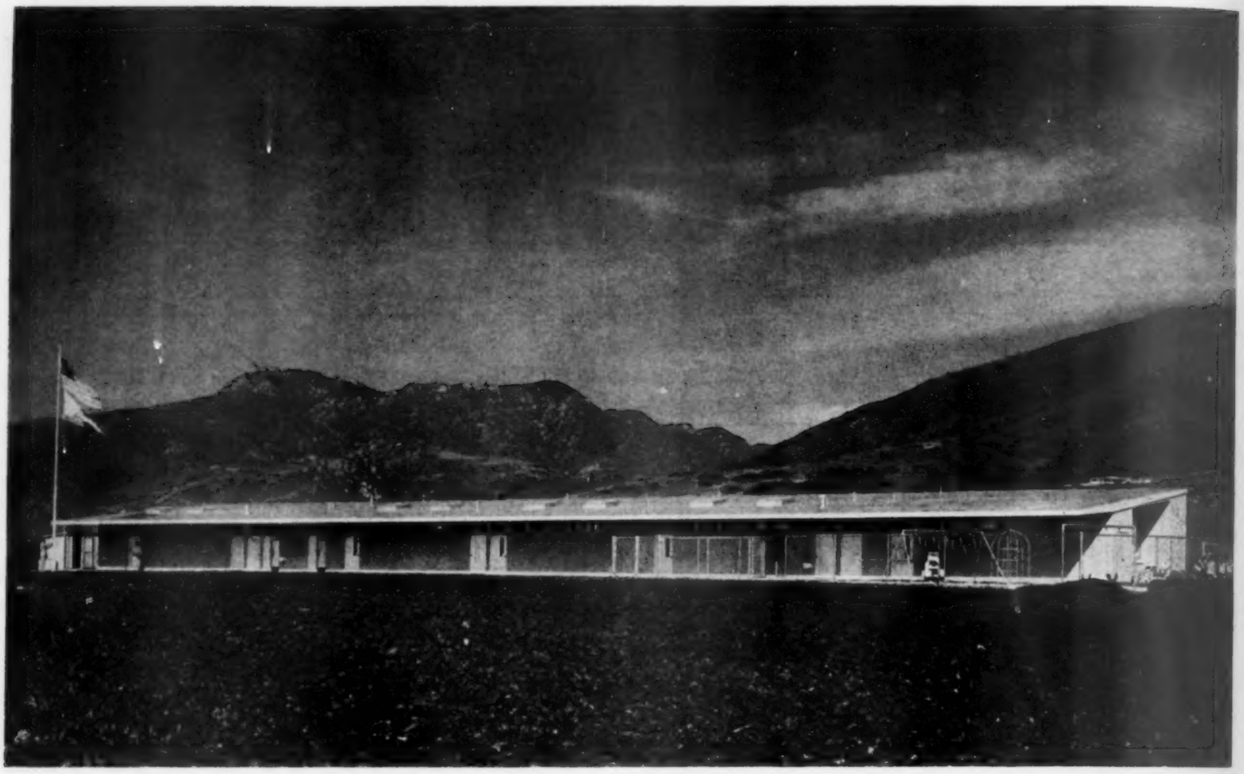
Frame and Stucco	$114,000.00
Steel and Cemesto Panels	130,799.00
Reinforced Concrete	145,988.00

Thus it appeared that steel would cost 14.73 percent more than wood frame and stucco, and that reinforced concrete would cost 28.07 percent more than wood frame and stucco.

It was estimated that the hung ceilings and the extra foundations added about 2.5 percent to the cost

The concrete building has a concrete shell roof arch with a suspended acoustical ceiling beneath. The walls are tilt-up concrete, 6 inches in width.



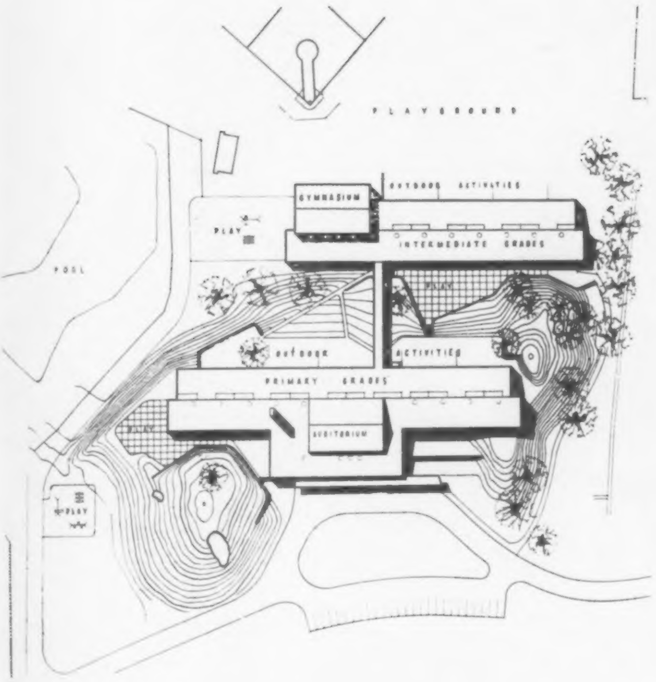


All rooms open onto the sheltered outdoor corridor of the Juan Cabrillo Elementary School in Santa Monica, California. The kindergarten, at the far right, has its own play yard. Administrative offices are at the far left and include the main office, principal's office and a room for the nurse.

of the reinforced concrete design. If these extra costs are deducted, reinforced concrete would cost approximately 24.86 percent more than wood frame and stucco.

Costs Are for California

It must be noted that the above experiment is valid only for California and even there may not represent the true cost of the building. If one is concerned only with the initial cost of the building, however, it can be said that in California wood frame and stucco is least costly to construct. Initial cost of steel construction is about 15 percent more than wood and reinforced concrete is about 25 percent more than wood.



The site of the Country School in Weston, Massachusetts, Hugh Stubbins and Associates, architects, presented many difficulties because of the irregularities of the ground and poor foundation conditions.

NEW APPROACH TO PLANNING A NEW ENGLAND ELEMENTARY SCHOOL

by CALVIN E. GROSS

Superintendent of Schools, Weston, Mass.

Dr. Gross has an A.B. degree from the University of California, an M.S. from the University of Southern California and an Ed.D. degree from Harvard University. He served as an army captain from 1941-46 and became a vice-principal in Los Angeles after the war. Dr. Gross has been with the Weston schools since 1951.

and HUGH STUBBINS

AIA, Architect, Cambridge, Massachusetts

Mr. Stubbins holds a B.S. degree from Georgia Institute of Technology and a M.Arch. from Harvard University. During his career as an architect he has been the recipient of many prizes and awards. Mr. Stubbins has been an associate professor at Harvard's Graduate School of Design and is now department chairman.

NEW England schools are built under a procedure that may seem quaint in other parts of the country. A special school building committee is appointed by the moderator of the annual town meeting and, once funds are appropriated, the committee is autonomous. Well-meaning but strong-minded and arbitrary committees have been known to plan and erect schools entirely according to their own notions of what schools should be like, without once consulting school officials and with the benefit of only meager knowledge about the activities the structure is to serve. With great pride and ceremonial flourish, the new school is presented as a surprise package to dismayed teachers who only then begin to discover the irremediable limitations which will inhibit their work for the next fifty years.

The Country School in Weston, Massachusetts, however, was built under the control of a committee with different ideas. The members of this committee decided immediately that, while they would maintain full legal and operational control, their school would be planned to fit the needs of the school program. An architect would be selected who could make a creative and functional application of the best educational recommendations available, primarily from local school people.

The committee chose their architect carefully after visiting and investigating dozens of new elementary schools. Concurrently, they developed the advisory machinery which eventually incorporated every organization in town and all echelons of the school system, including the custodians and the children. As their credo they adopted a statement written by Thomas McFarlin, the elementary school principal. This statement, part of the educational specifications for the new school, reads:

> The complexity of living in today's world presents a tremendous challenge to the educational program in the elementary school. No longer can this program be confined within the walls of a classroom or

A glazed ramp connects the school's lower, north wing, containing the intermediate grades and the gymnasium, with the upper south wing, housing the primary grades.

school plant. It must be concerned with all aspects of the pupil's life which influence his growth and development. It must teach the three R's and much more. It must give each pupil knowledge and understanding of his environment and provide a setting where he can work and live individually and with others, a setting where he will develop and maintain sound physical and mental health. Although the scope of this program reaches far beyond the classroom and school plant, the modern elementary school building must serve as the center around which many learning activities revolve.

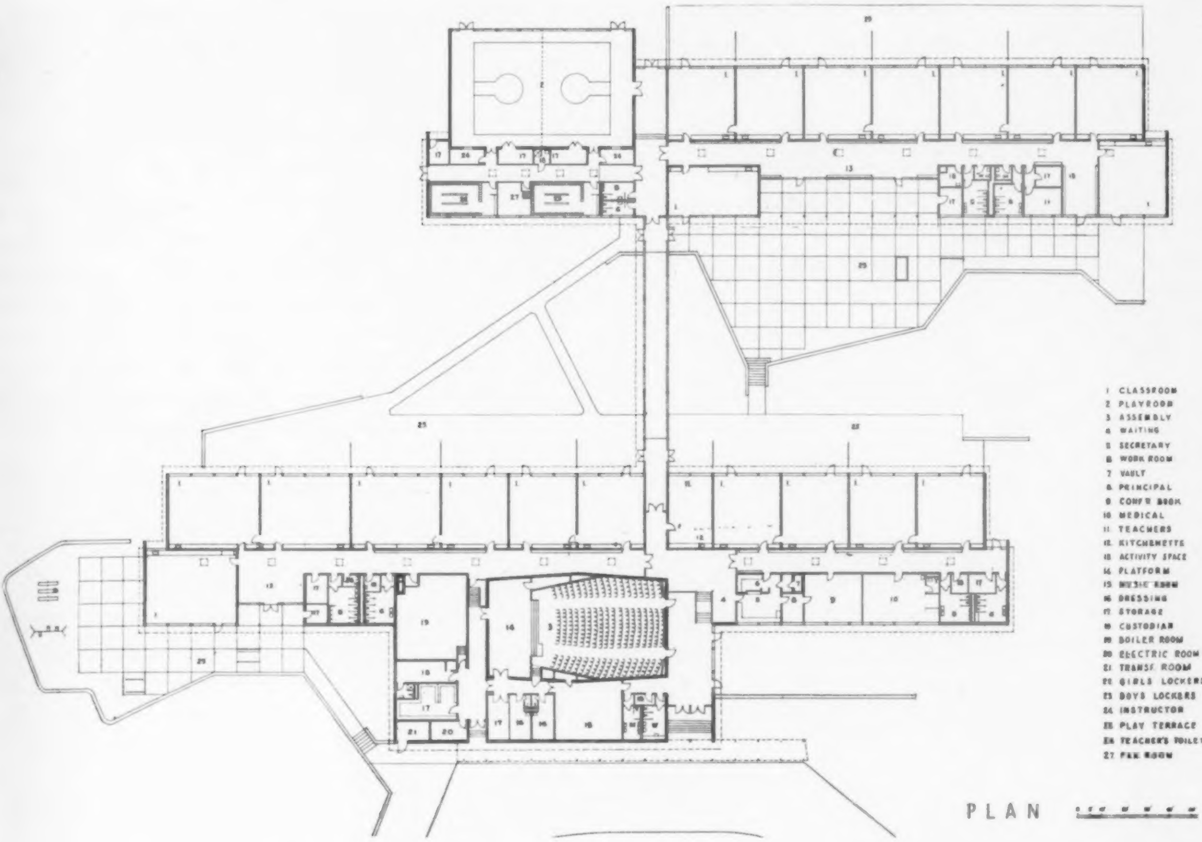
Today, nearly all children love to go to school. This is as it should be, of course, and is due in large part to the degree to which the school becomes a home for each child rather than an institution for many children. It must provide adequate space and facilities for all the activities which are necessary to meet each pupil's changing educational needs. The school building must be constructed and equipped to reflect a homey and intimate atmosphere in which pupils may live and work.

Early in the planning stage, the school committee approved and forwarded to the building committee an outline of the facilities they wished to see incorporated in the new structure. This outline had been prepared by the superintendent and the school staff. The school committee also appointed one of its members to meet frequently with the building committee.

Subsequently, the superintendent and principal prepared a more detailed list of suggested specifications and these were turned over to the architect. After the architect had prepared preliminary sketches, the members of the building committee went at least once to the meetings of every organization in town to describe and discuss the proposed new twenty-room school. When the 1.11 million dollar appropriation came to a vote, it was passed by a 93 percent majority.

A Committee of Teachers

A notable feature of the planning process was a building committee of teachers, one from each of the elementary grades. Together with the superintendent and principal, this committee performed liaison duties between the entire elementary faculty and the building committee and architect. It took time and effort for this teachers' committee to develop the ability to communicate effectively. They concerned themselves largely with classroom features and arrangements, and had to



The north wing of the Country School contains the gymnasium, intermediate classrooms, teachers' rooms, storage areas and dressing rooms. The south wing houses the primary classrooms, the auditorium, music room, administration offices, medical room, library and custodial areas.

Despite the irregularities of the site it contains many beautiful wooded areas. With successful utilization, the site has proved to be a real asset to the school.

Eastern Aerial Surveys, Inc.

reconcile the multitude of teachers' desires and ideas, sometimes unusual and often conflicting, with the overall structural design and considerations of space and economy.

This special committee directed the preparation of memoranda by teachers of each elementary grade, detailing the equipment, facilities and arrangements considered desirable for that grade. Members of the committee also standardized wall and floor plans for primary and intermediate grades, and submitted them to the architect for modification and further discussion.

Classroom Features

Some of the classroom features which were determined by this process were: classroom dimensions that are almost square, each room containing 930 square feet of area; multi-lateral natural lighting; an outdoor exit for each room opens onto a paved play area; connecting doors between adjacent pairs of classrooms; natural slate chalkboards with map-rails above; sinks with hot and cold water, a drinking fountain and a long work counter on each side; doors on all closets and cupboards; cubbyhole storage for each child; screens on windows that open; an adequate number of electrical outlets per room; and a telephone connecting to other classrooms through the office.

Furniture and Equipment

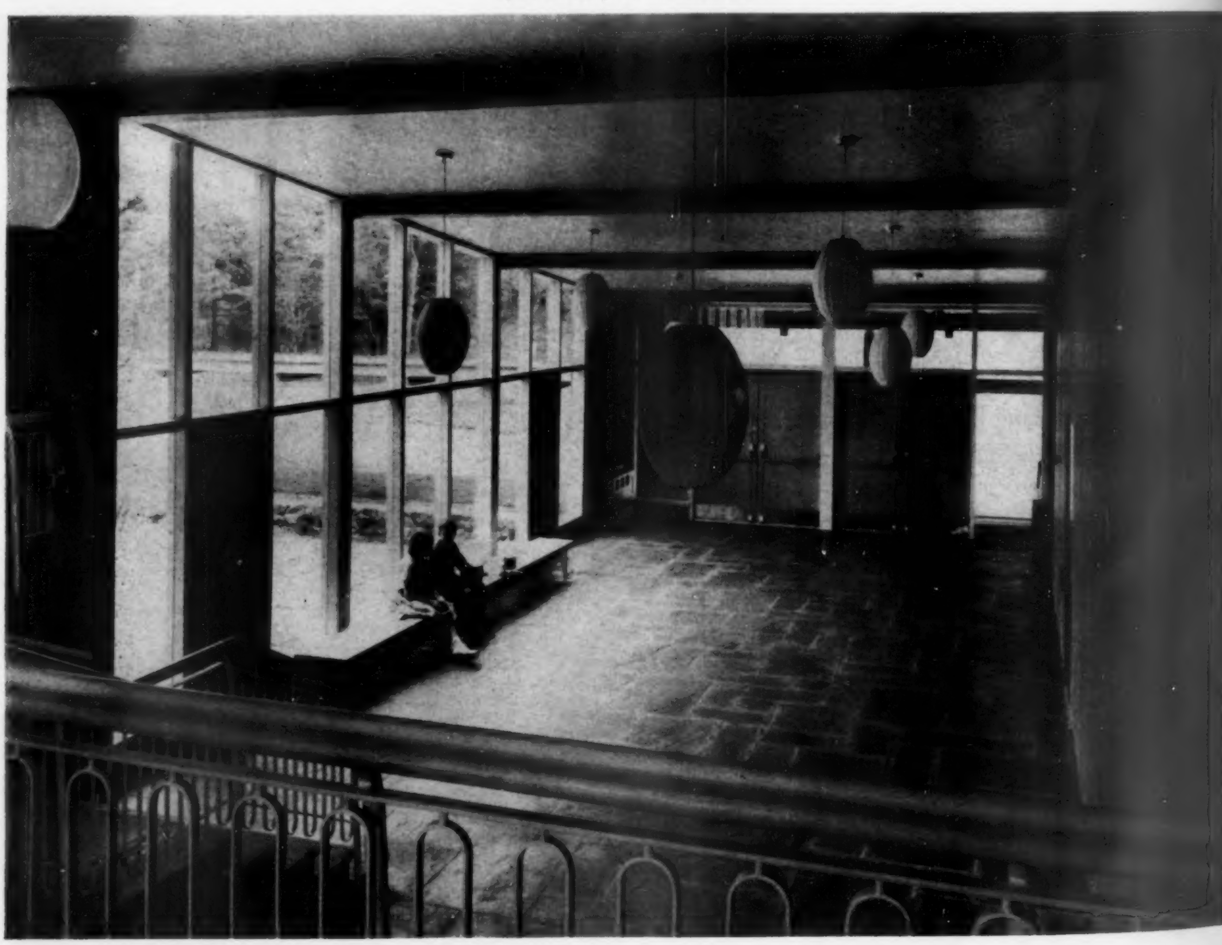
Furniture and equipment include lift-lid pupil desks with separate chairs, low movable bookcases with tackboard on the reverse side, round reading tables, sets of trapezoidal multi-purpose tables, easels, record players, pianos, aquariums and copper planting boxes.

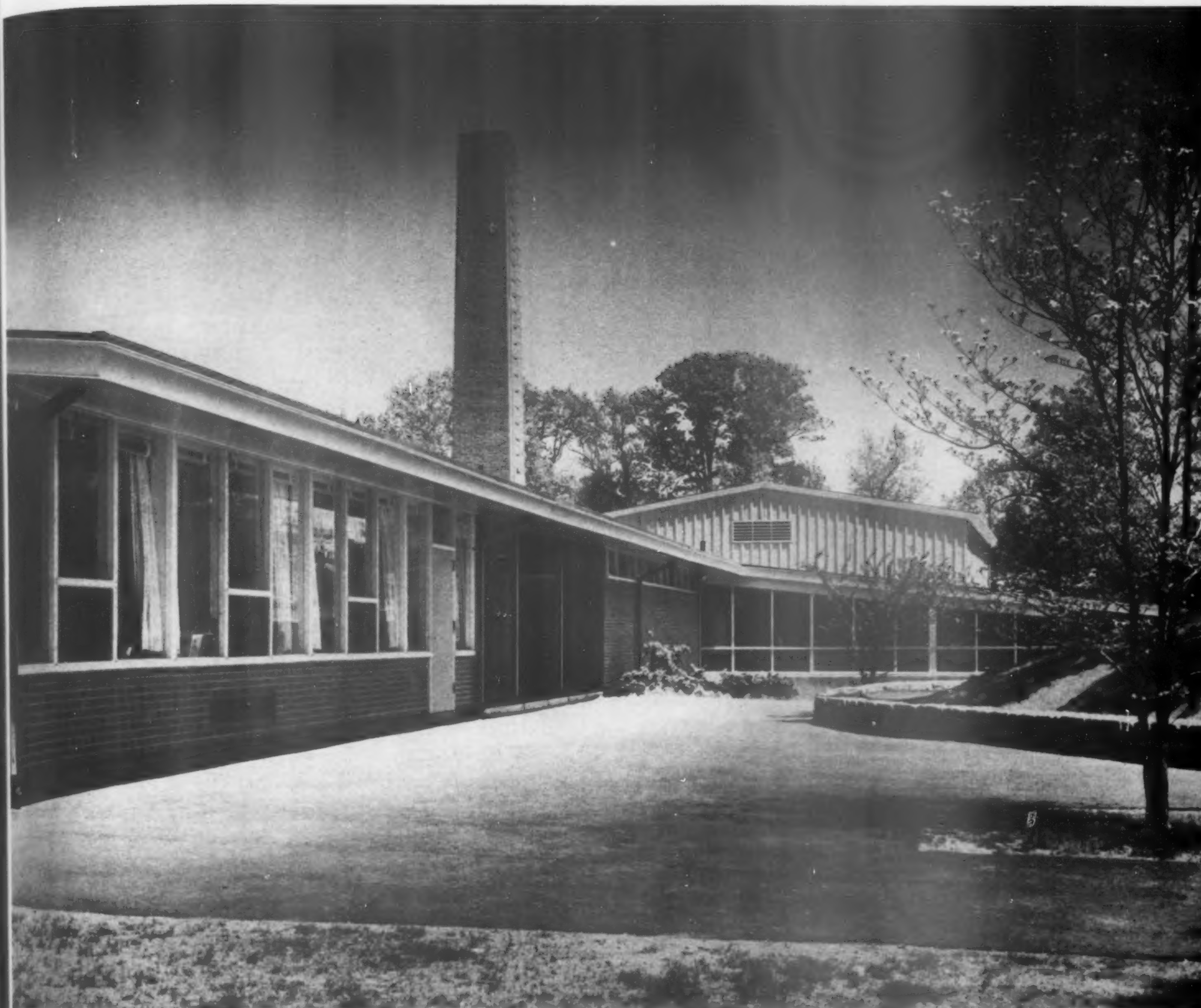
The first grade rooms contain 1,200 square feet of area and have inside coat storage facilities. These rooms feature many special items of equipment such as sand tables, work benches with vises and large abacuses.

Irregularities of the Site

The site of the Country School, although conveniently located to the town center and other central school facilities, presented many difficulties because of the extreme irregularity of the ground, poor foundation conditions in the low section, drainage problems, long access roads and the situation of a ledge on two knolls. However, it had many beautiful trees and was a chal-

A bluestone floor marks the entranceway to the auditorium of the Country School. The stairs in the foreground lead to the administrative areas, and the double doors open directly to the outside.





Each classroom of the Country School has an outdoor exit. The boiler room, in the background, is adjacent to the custodian's room, a storage room and the electricity and transformer areas. Between the boiler room and the classroom at the left are boys' and girls' toilets.

lenge to the architect. The site has been utilized successfully and has proved to be a real asset.

The Country School has certain facilities not usually included in elementary school plans, such as a sloping floor in the auditorium and a rather extensive playground suitable for little league baseball. The gymnasium layout permits the use of physical education facilities by the recreation department of the town, especially the swimming pool, when the school is not in session.

School Has Two Main Areas

The building is divided into two main areas. The south wing was constructed between the two rocky knolls and contains the primary classrooms, auditorium, music room, administration offices, medical room, library-conference room, boiler room and custodial facilities.

Connected by a glazed ramp, the north wing is built on lower ground and houses the intermediate grades four to six and the divided gymnasium which has boys' and girls' dressing rooms.

Some of the features of the new school are:

1. An extensive covered platform permitting all children to get on and off buses under shelter.
2. Bluestone floors in the most heavily traveled areas for ease of maintenance.

Gottscho-Schleisner Photos

The auditorium of the school rises higher than other units in the same wing. The assembly area has a sloping floor and a large stage. Dressing rooms and a storage space are nearby.

3. Easily accessible and separated play areas.
4. Auditorium and related areas located for use in the evenings by community groups.
5. All but three classrooms face north to eliminate the use of Venetian blinds and to assure constant side lighting supplemented by overhead natural light.
6. The four first grade classrooms, with 1,200 square feet of area are approximately one and one-third times the size of other rooms. This permits the separation of first grade classes into small groups.
7. Each wing has conveniently located inside and outside storage rooms, custodial facilities, teachers' rooms and toilets.

The Country School in Weston, Massachusetts, Hugh Stubbins, architect, has been receiving awards since its early design stage. In 1953 the preliminary design of the building merited one of *Progressive Architecture's* award citations in that magazine's first awards program.

Upon completion this spring, the Boston Society of Architects voted to award this building the Harleston Parker medal. This medal is given each year for the "most beautiful piece of architecture" selected within the Boston city limits or the Metropolitan Park District. The Country School was also given an award citation by the Boston Arts Festival jury which considered entries in all building categories in the New England area.

A NEIGHBORHOOD ELEMENTARY SCHOOL FOR CEDAR CITY, UTAH

by L. ROBERT GARDNER

AIA, Architect, Cedar City, Utah

Mr. Gardner attended the College of Southern Utah at Cedar City and has a Bachelor of Architecture degree from Massachusetts Institute of Technology. He served an internship at the office of Ashton, Evans and Brazier, Architects, in Salt Lake City and became a licensed architect in the State of Utah in 1947. Mr. Gardner is also licensed in the State of Arizona.

CEDAR City, a town of approximately 6,500 persons located in a sparsely populated section of southwestern Utah, is devoted primarily to livestock production and iron ore mining. It is the rail head and distribution center for all of southwestern Utah, being just off the Union Pacific mainline between Salt Lake City and Los Angeles. A Union Pacific subsidiary, the Utah Parks Company—which is concessionaire at Zion National Park, Bryce Canyon National Park and the North Rim of the Grand Canyon—has its headquarters in Cedar City.

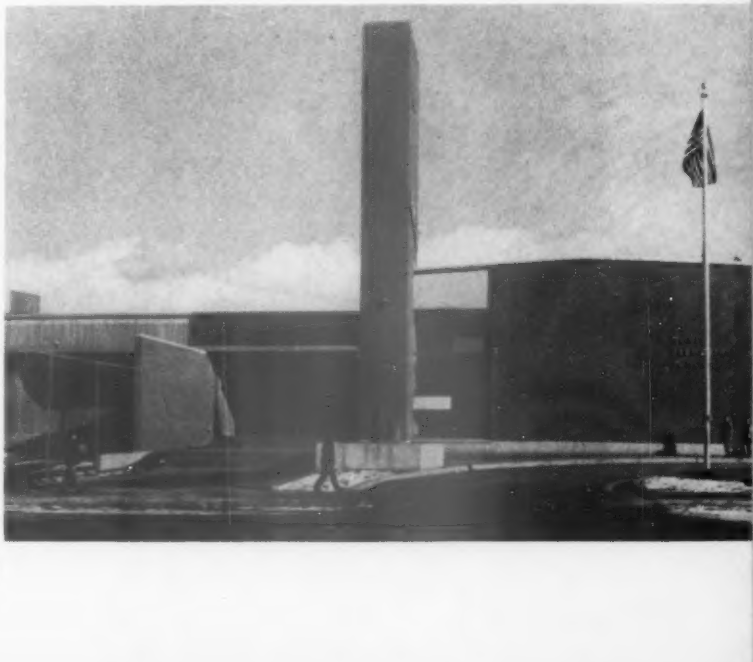
Also located in Cedar City is the College of Southern Utah, the southern branch of the Utah State Agricultural College, Utah's land grant college. A cooperative arrangement has been made whereby teacher trainees from the College of Southern Utah gain practical classroom experience in the city's elementary schools as part of their preparation for graduation.

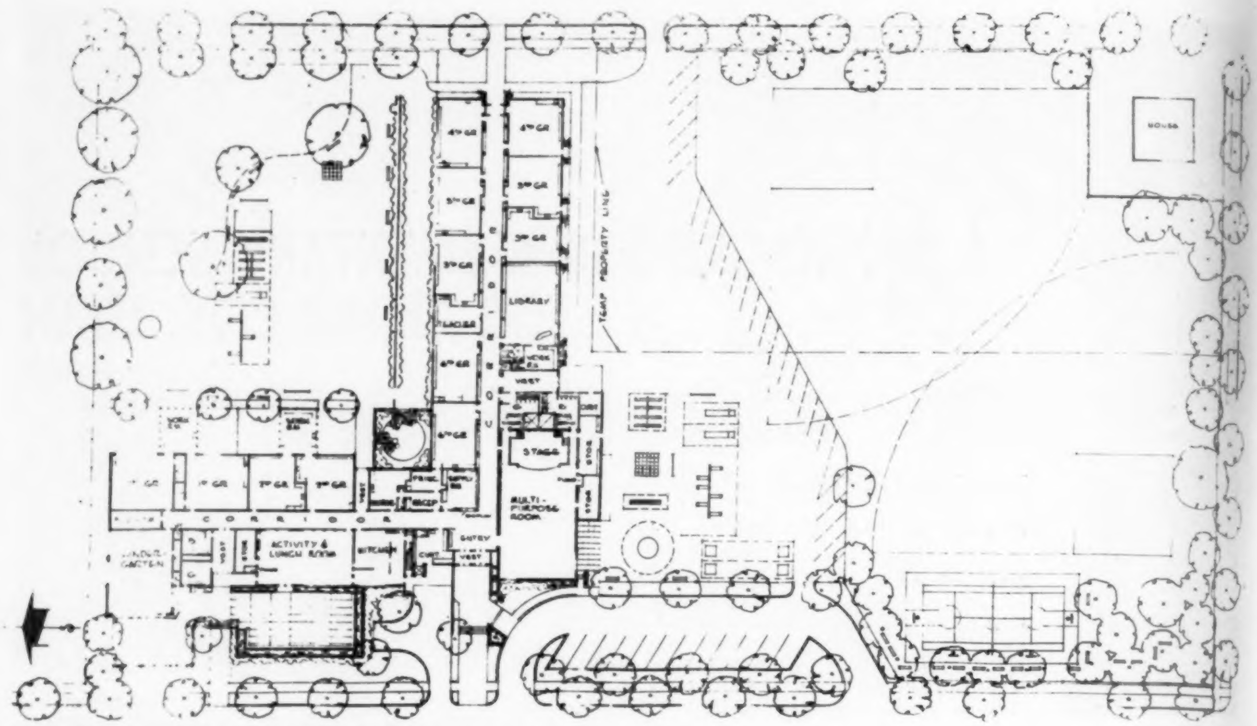
Our school district, under the direction of Ianthus Wright, superintendent of schools, covers the entirety of Iron County, Utah, and is fortunate compared to neighboring school districts. The Iron County School District is able, at present, to carry on its building program on a cash basis because of the tax revenue from iron ore production and railroad operations.

Prior to 1950, all Cedar City public schools—elementary, junior high and senior high—had been housed on one campus. At that time, the Iron County School District embarked on a long-range program to establish neighborhood elementary schools and relegate all existing facilities to junior and senior high school use. The first step in the program was the construction of the East Elementary School which was occupied in the fall of 1950.

The second step was the North Elementary School which was occupied in the fall of 1954. The third step, currently under construction, consists of a building which is being sandwiched between the existing junior high and a former elementary school to form one large

The new North Elementary School was occupied in the fall of 1954.





North Elementary School, L. Robert Gardner, architect, has a multi-purpose room, library, activity-lunchroom, administrative areas, a teachers' room and custodial spaces in addition to twelve classrooms and a kindergarten.

junior high school building. The fourth step will be the construction of a third elementary school to serve the southwest part of the city.

Facilities in the North School

The North Elementary School has twelve classrooms and a kindergarten and is intended to serve an average of 430 students. To fulfill the program requirements of the building there are a school lunch kitchen and a lunchroom which doubles as an activity room for music and other group activities. This room also has a fireplace and a barbecue grill. There is a larger multi-purpose room with a stage for assemblies, active recreation and indoor games. Shower rooms for both boys and girls are adjacent to the multi-purpose room and those children who do not gain habits of cleanliness at home can be taught at school. The library, large enough to accommodate an entire class, has a workroom and storage facilities for audio-visual aids.

There is a teachers' lounge with limited cooking facilities. The administration suite includes the principal's office, nurses' room, waiting room, staff toilet facilities and a central supply room. The principal is required to teach part-time, so his office connects directly with one classroom. The master clock and sound system console are located in the principal's office.

The custodian's workroom doubles as a receiving and unpacking room. A warehouse for school lunch supplies for the entire school district is in the basement of the school. This facility occupies about 4,000 square

The primary wing of the building has projecting workrooms which are glass enclosed.

Lunches are prepared for the school children in a well equipped kitchen. All school lunch supplies are delivered at an adjacent service dock.

feet of space and has a root cellar, a large area for dry and bulk storage, a walk-in cooler and a walk-in freezer. It is served by an elevator from the service dock which also serves the boiler room and general storage room in the basement.

The custodian's room, school lunch kitchen, elevator and coal dump are all grouped around a single service dock so that all deliveries and refuse removal, as well as school lunch supplies, are handled at a single point.

Daylighting the Rooms

Program instructions to the architect included numerous classroom requirements. One important specification was the provision of good daylighting. Classrooms with north exposure have extra large continuous windows giving unilateral north light. These rooms are narrower and longer than the other rooms.

Classrooms with south, east and west exposure have two sets of windows—a lower, shaded, continuous band for vision and light, and a continuous clerestory above the center of the classroom which brings daylight to the inside wall. The kindergarten has windows on three sides.

Built-in classroom cabinetwork with a sink and bubbler is located in each room. Base cabinets with worktops and drawers, shelves, bins and wall cabinets take care of practically every type of storage which is required. Movable work benches, book cabinets and teachers' desks were custom designed by the architect. The teacher has a locked closet for supplies.

The kindergarten, first and second grades have movable coat cabinets within each room. These, together with the book cabinets, can be shifted around as space dividers at the option of the teacher.

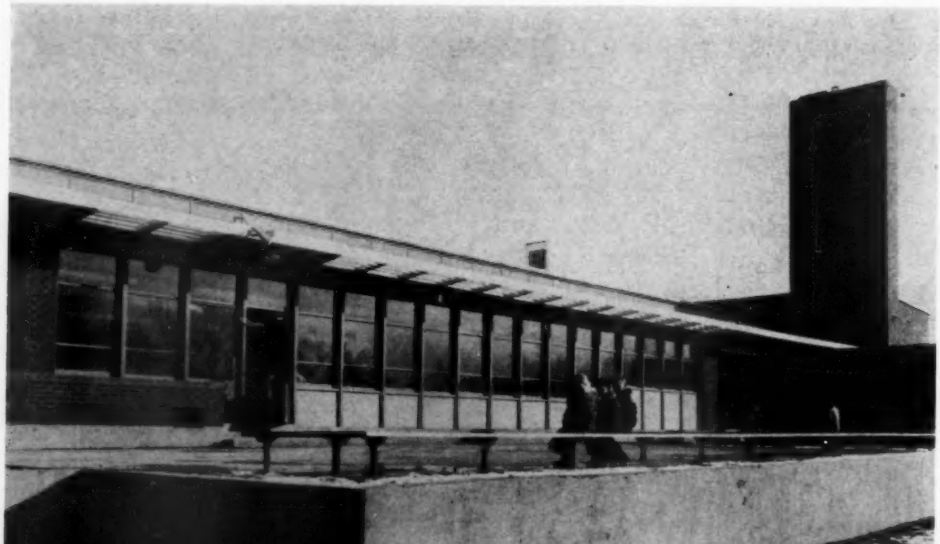
The building and grounds are arranged to provide a natural (though not rigid) separation of classroom and playground facilities for kindergarten, first and second grades and upper grade areas. The school is designed for community as well as school uses. In other words, the building can function for more than six hours a day. The local school board feels that it has a definite responsibility to the community-at-large as well as to the schools.

Classroom Activity Areas

The small children have warm floors in their rooms through radiant heat panels, but the older students do

Animal cutouts decorate the walls of the kindergarten. A stout work bench is available for special projects. Other furniture includes desks and chairs, round and oblong tables.

A continuous clerestory above the center of the classrooms brings daylight to the inner section. This first grade room opens into a solarium-work room.



The lunch-activity room has a wide terrace with benches. The windows are shaded by a louvered overhang.

The elementary wing of the North Elementary School contains classrooms for the fourth, fifth and sixth grades, the teachers' room and the library.

The vestibule and entry of the building lead directly to the reception room of the administrative area.

not need this provision. There are outdoor instructional areas for the first and second grades. Since Cedar City is at a high elevation (almost 6,000 feet above sea level), we have some rather cold spells during the winter. Because of this, it was later decided to add, as an experiment, two plexiglass, roofed "sun-workrooms" for the first and second grade rooms. Some classroom activities are carried on in these rooms as a means of gaining additional "irradiation" during the winter months. The rooms also serve quite effectively as greenhouses, but it has been found that they get too hot for use in the early fall and late spring.

Outdoor Activity Areas

A paved terrace for group activity and community use is located off the lunch-activity room on the street side of the building. A substantial portion of each play area is blacktopped and the areas for various playground activities are defined with due consideration for landscaping.

To assure that outdoor areas are carefully planned and integrated with indoor areas, a landscape architect, Leon Frehner of Salt Lake City, was consulted. Mr. Frehner assisted in establishing the basic shape of the building and related outdoor areas and, finally, prepared a complete site and planting plan.

The building is located in a built-up area, consequently it was impossible to obtain as much property as would have been desired for the school site. The school board is obtaining adjacent property as fast as it becomes available in anticipation of expansion. Expansion of the building could be made by the addition of an upper classroom wing to the south of the existing wing, or by extension of the corridor to the north between the kindergarten and first grade rooms (space now shown as a book room).

The structural engineer for the North Elementary School was Hoffman C. Hughes, Salt Lake City. The firm of Blomquist and Brown, also of Salt Lake City, acted as electrical engineers for the project. John Lyon Reid, architect of San Francisco, graciously acted as design critic.

General construction was done by the Witt Construction Company of Provo; plumbing and heating by the Atkin Plumbing and Heating Company of Cedar City; and all electrical work was by the Millard Electric Company in Fillmore.

Construction Outline

The foundations and footings of the building are reinforced concrete. Floors in the basement are slab-on-earth, with a suspended concrete beam and slab over the basement. Elsewhere the floors are slab-on-earth.

The roof framing consists of open type steel joists and steel beams and trusses. All interior columns are in concealed locations. Where columns are exposed at the window walls, they are four-inch square steel tubes which also serve as window mullions. The roof deck is three-inch insulating concrete on self-centering lath. The roofing is twenty-year built-up asphalt and gravel.

Under windows, the exterior walls are precast terrazzo slabs with concrete blocks for back-up. Elsewhere, the exterior walls are clay brick with a concrete block back-up. Interior partitions generally consist of painted concrete block, with face brick in some locations. Special wainscots in the kitchen and corridors have glazed facing tile; in the toilet rooms there is glazed ceramic tile. The classrooms have honed concrete block wainscots.

Flooring and Ceilings

All floors are of asphalt tile except for ceramic tile in toilet rooms; maple in the multi-purpose room; and concrete in the service areas. Ceilings are perforated fiber acoustic tile cemented to plaster.

The built-in cabinets are constructed of pine, although birch is used in some locations. Door frames in the entrances are stainless steel. Steel casement doors lead from classrooms to the outside. All other door frames are hollow metal. Window sashes are steel, semi-intermediate weight, projected with bronze and felt weatherstripping.

The heating system in the North Elementary School consists of a coal-fired steam split system with radiant floor panels in the kindergarten, first and second grade areas. Elsewhere there are wall hung convectors. A central fan ventilating system supplies all classrooms. The kindergarten, first and second grades have additional blast coils in the ventilating ducts which compensate for any sluggishness in the floor panels. Pneumatic, individual room type thermostats control the temperature in the building.

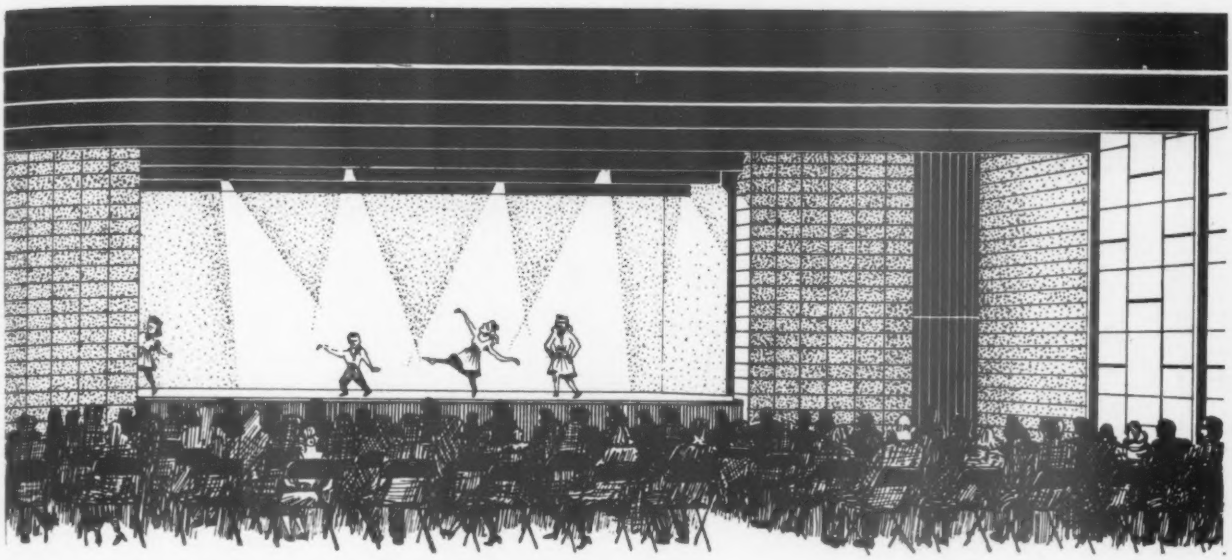
Homer Jones Photos

The large multi-purpose room has its own exit to the out-of-doors. The room has a stage and nearby shower rooms for boys and girls.

Classrooms have concentric ring incandescent light fixtures. The corridors and other rooms which will be used at night have slimline fluorescent fixtures. There is an electronic clock and program system with clocks in each room. A complete sound system is also provided.

Costs and Figures

The contract price for the complete building, including mechanical systems, custom built furniture and yard construction (blacktopping, fencing, terracing, tennis court, benches, curb, gutter and parking areas) amounted to a total of $558,401. This does not include stock classroom furniture which was purchased separately. The building area amounts to 41,471 square feet, including the basement area. The cost per square foot of the North Elementary School was $13.48.



The large all-purpose room of the Honey Grove Elementary School in Honey Grove, Texas, Stanley Brown, architect, has a wide stage and serves as a visual aids room, play area and auditorium.

AN ELEMENTARY SCHOOL FOR A SMALL SITE

by STANLEY BROWN

AIA, Architect, Dallas, Texas

Stanley Brown received his higher education at Texas Technological College at Lubbock, and at the "T" Square Club of Philadelphia. He has practiced architecture in Texas and the Southwest for twenty-five years. Most of his work has been designing school buildings.

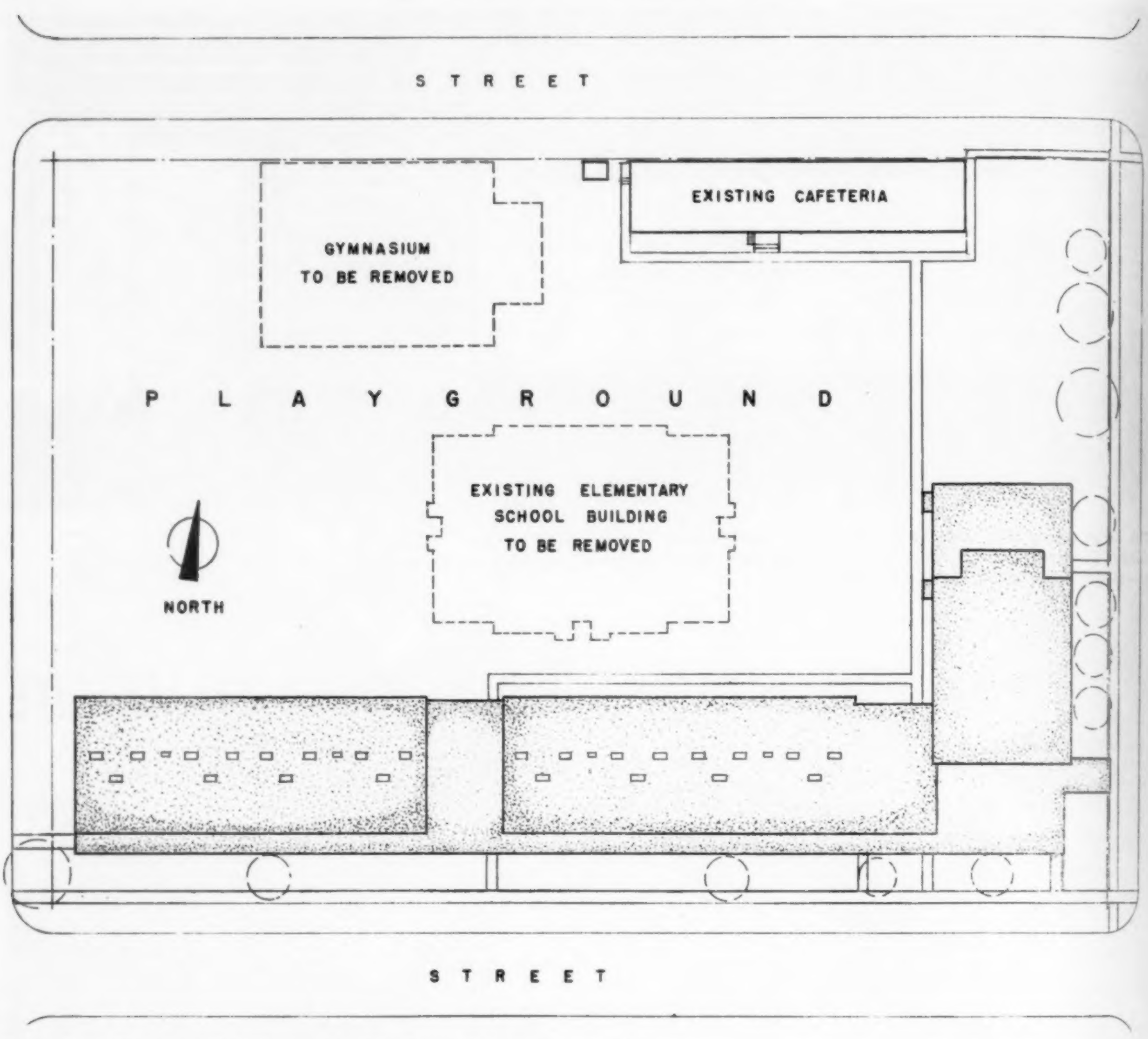
SCHOOL boards are often faced with the task of providing adequate sites for buildings. In some cases a site at the proper location is not available under any condition. Such a problem faced the school board at Honey Grove, Texas, when the community voted bonds for an elementary school. Honey Grove is located in a farming and ranching area where there is little or no reason to expect an increase in population. Completed consolidation programs have also stabilized the school population.

Various sites were considered but each had its faults, such as poor location or inaccessibility to public utilities. The forty-year-old elementary school building was situated on a three-acre tract in the center of the school population. This site also contained an old combination gymnasium and bus garage. It was decided to use this site and to take steps to purchase adjoining land when such was available.

The board instructed the architect to design a building to house 450 children in grades one through eight. Ample indoor playing space and a department for exceptional children were to be included in the plans. The recently constructed cafeteria building would remain for the use of all the children. The new building was to be one story for safety reasons and also because many disadvantages had been encountered in the two story design of the old building.

Locating the Building

In order to utilize the site to the best advantage, the new building was placed at one corner. This location also enabled the children to use the old building



Honey Grove Elementary School was placed at the southeast corner of a site which already contained a gymnasium building and an exisiting elementary school, both of which buildings were to be removed. The building has an open porch corridor for the south front.

during construction of the new school. The only logical direction for the site to grow was north, so the building was placed at the southeast corner. The building was designed to utilize an open porch corridor for the south front. Climatic conditions have proved such a corridor to be a success in many ways.

There are six classrooms for the first three grades. Adjoining these rooms, small rest rooms are provided for the use of the children. Near the rest room area is a workroom or project space. These workrooms are to be used alternately by small groups from the nearest classrooms and have a sink and cabinet space for various student activities. Control of the project area by either teacher is facilitated by large fixed-glass windows

The school has six classrooms for the first three grades and nine regular classrooms for grades four through eight, in addition to special areas.

A library, shown unfurnished, and adjoining workroom are located near the classrooms.

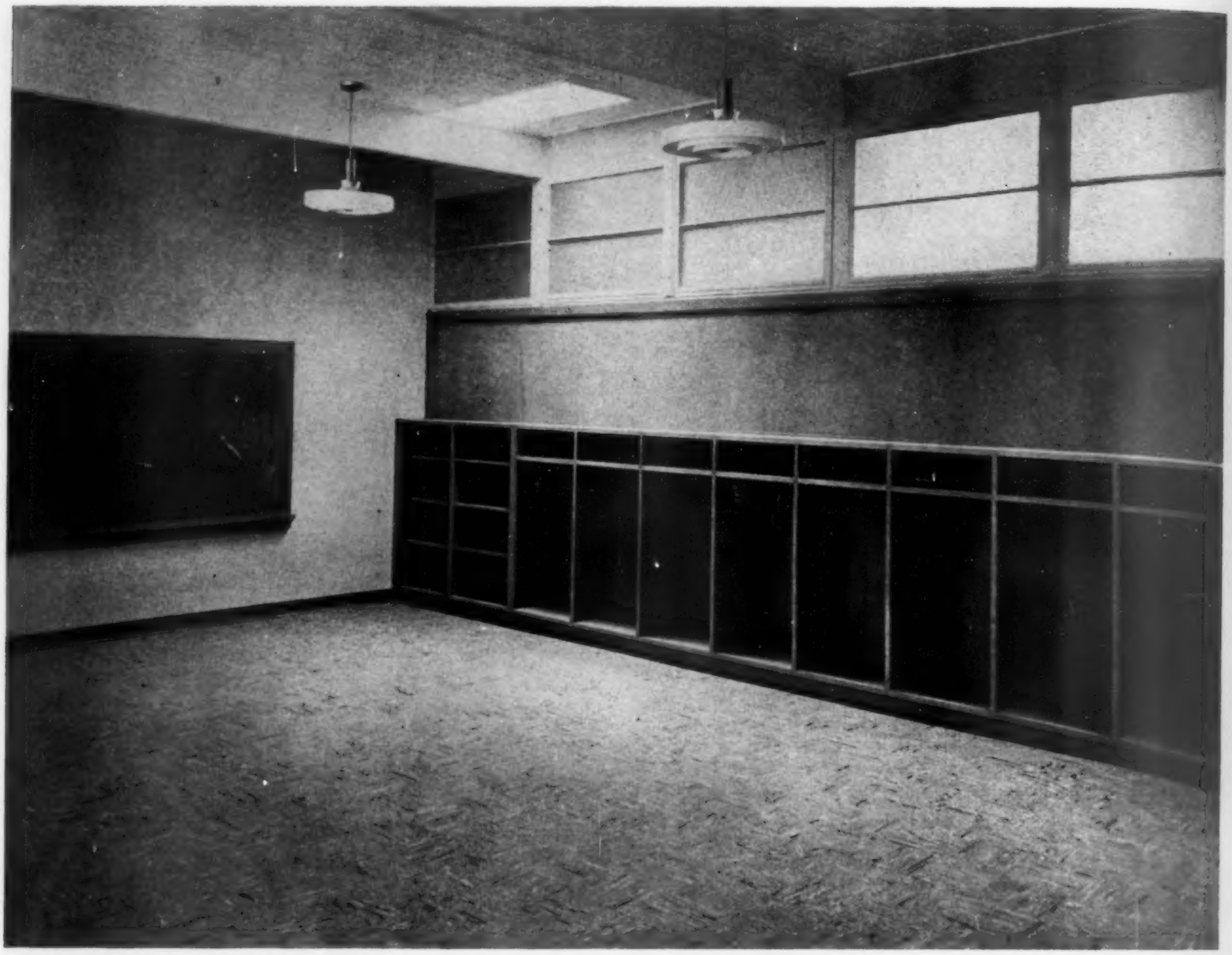
on either side. Drinking fountains and lavatories are placed in each of these classrooms.

Nine regular classrooms are provided for grades four through eight. Two large rest rooms opening to the classroom area and the playground serve these children. Outside drinking fountains located under the covered area provide chilled water for students at play. A library with workroom is located near these classrooms.

The Exceptional Children's Room

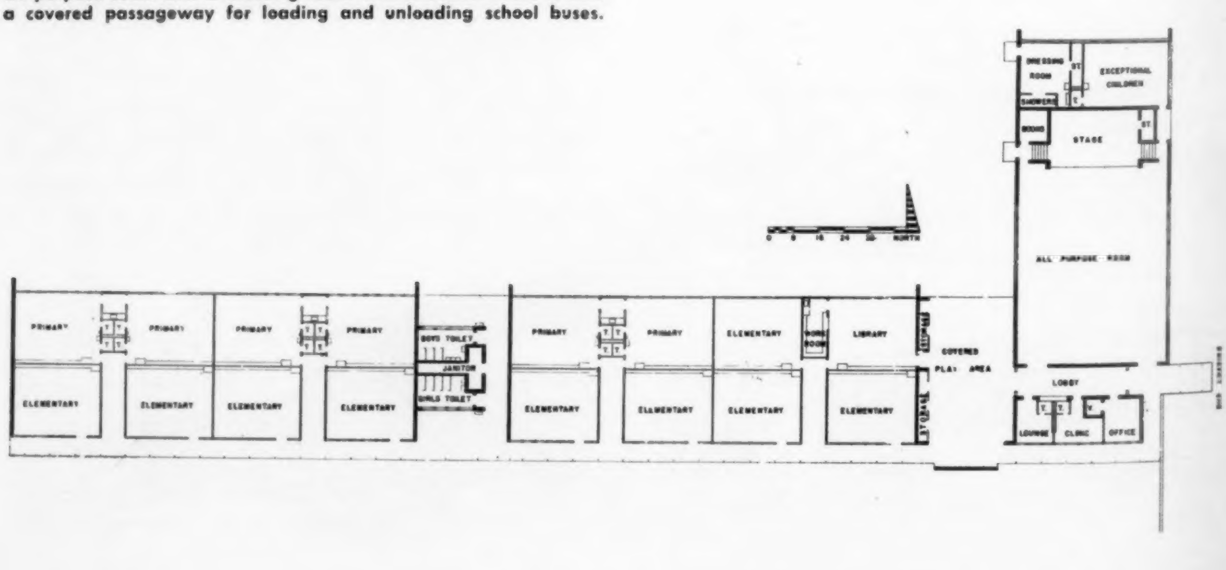
The classroom for exceptional children is placed at the side and rear of the building. This location makes it easy for parents to take these children to and from school without interference with the regular school program. Partial isolation of the area also gives better teaching facilities for this type of student. The department contains a small kitchen and a refrigerator, and is equipped for visual aids. A rest room is located adjacent to the classroom. Normally there will be from twelve to fifteen children in this section.

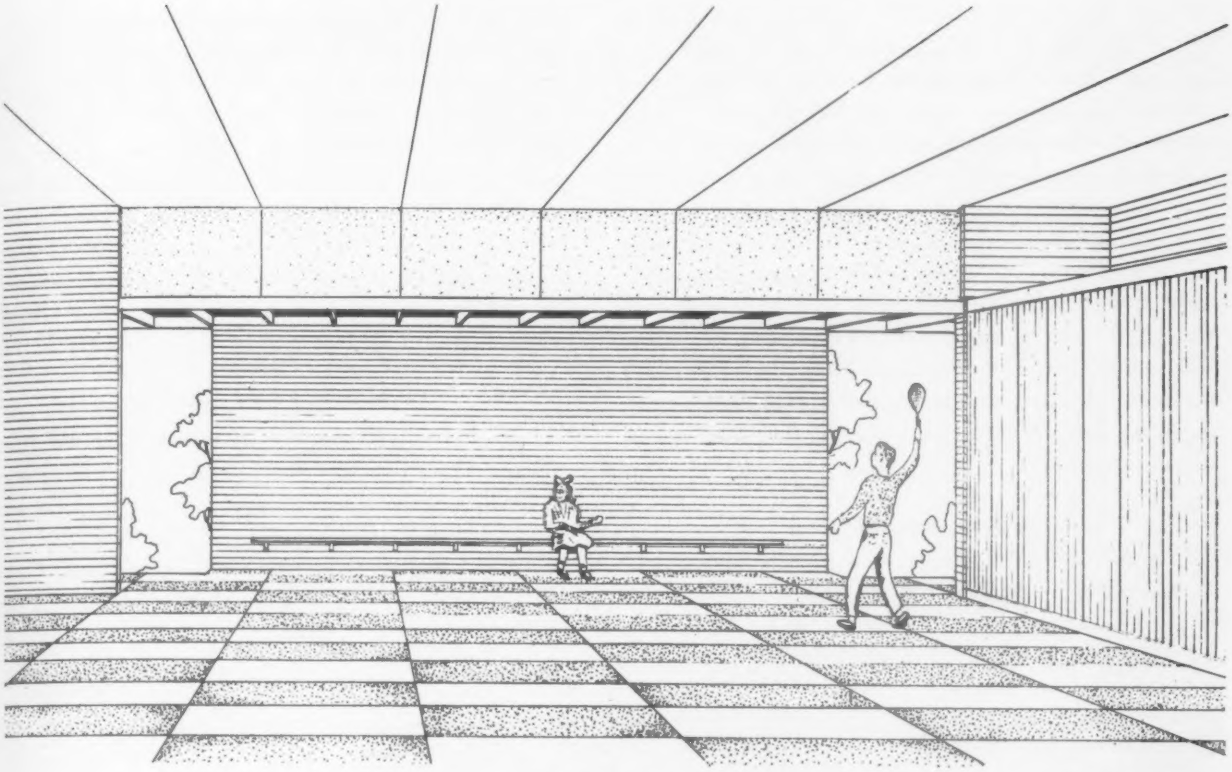
Each of the classrooms is equipped with ample chalkboards, bulletin boards and bookshelving. Open type cloak spaces are used for children's wraps. A teacher's cabinet is placed in each room.



Each classroom in the Honey Grove Elementary School is equipped with ample chalkboards, bulletin boards and bookshelving. Open type cloak spaces are used for children's wraps. These units have upper shelves for books or hats.

The floor plan for the school shows the L-shaped design of the building. Special areas include a room for exceptional children, a covered play area, teachers' lounge, a clinic, the office, an all-purpose room and a dressing room with showers. There is also a covered passageway for loading and unloading school buses.





The large play area provided at one end of the classroom wing has a roof and can be closed entirely by the use of a folding door. This provides protection from the strong north winds. The plan for the use of this room is as a play area in inclement weather only, with its main use being as a leisure time area during class recesses.

A large all-purpose room with a stage serves as an auditorium, a visual aids room and a play area. Another play area is provided at one end of the classroom wing, and can be protected from north winds by a folding door. Closets for the storage of playground equipment are provided. This space is designed for a play area during inclement weather only, while its usual use will be for leisure during recesses.

A small shower and rest room at the rear of the building is to be used by boys who are on the school's athletic teams. The administration area contains an office with a storage vault, a lounge and rest room for women teachers, a health room with rest room and a lobby.

Ventilation and Heating

The short halls that connect the north classrooms with the open corridor on the south serve as a funnel

Classrooms have asphalt tile floors, with fiberboard tile for the finished ceiling. Lighting is by concentric ring incandescent fixtures. The inside wall of the classroom is given natural lighting from plastic bubble skylights.

to force the cool south breezes into the rooms. Forced-air heating units are advantageously placed above these corridors. The balance of the building is heated with exposed ceiling-hung, forced-air heaters, with the exception of the administration area, which has wall heaters. All heating is with natural gas to each unit.

The window wall construction of projected steel sash and insulated asbestos board provides much natural light. Plastic bubble skylights give additional daylight at the inside classroom wall. A roof overhang on the north side of the classrooms prevents sky glare. The winter sun is controlled at the south clerestory windows by tilted screens of the slatted louver type. Artificial light is provided by concentric ring incandescent fixtures.

Flooring and Roofing

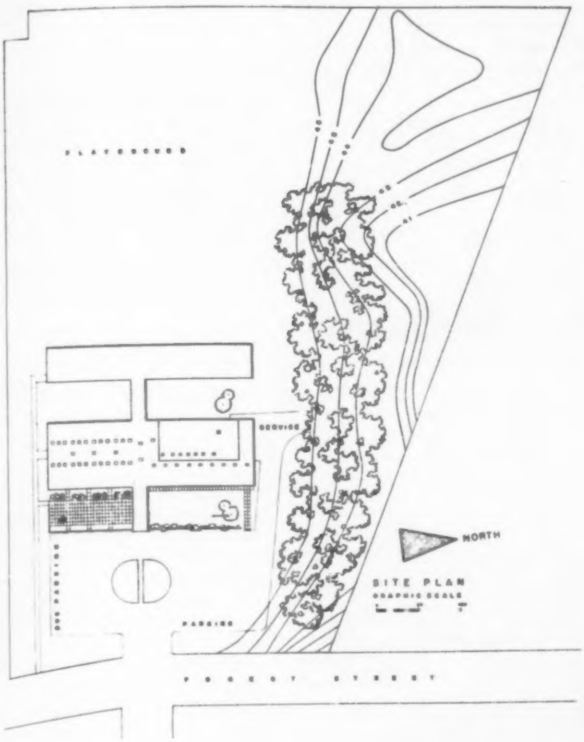
Almost all of the interior floors are asphalt tile over a concrete slab on fill. The stage floor is wood and the main rest room floors are ceramic tile. Smooth tile wainscots and steel partitions are used in the main rest rooms. The roof construction is of wood joists, laminated wood beams and wood decking covered with a built-up roof. Fiberboard tile is used for the finished ceiling. Where non-bearing walls occur, plaster over metal lath was used. Other interior walls are of light-weight concrete masonry units with an occasional wall being of face brick, such as in the lobby. The exterior of the building is warm pink brick. The asbestos portion of the window wall is painted in several bright colors.

A Covered Passageway

A covered passageway is provided for unloading school buses in inclement weather. The open corridor on the south front makes an excellent place for children to wait for parents at the close of school.

This building contains 21,500 square feet of area and was built at a cost of $154,500, exclusive of the architect's fee.

The project room can be seen through the wide window at the right. The teacher's cabinet is located next to the children's clothing wardrobes. Each primary room has a sink and drinking fountain.



Expansion of the Trent Park Elementary School in New Bern, North Carolina, will be effected with a series of single loaded corridor additions paralleling the main nucleus and connected to it by short covered walks.

TRENT PARK—ELEMENTARY SCHOOL DESIGNED FOR EXPANSION

by ROBERT H. STEPHENS

The Firm of Burett H. Stephens, AIA, and Robert H. Stephens, AIA, Architects, New Bern, North Carolina

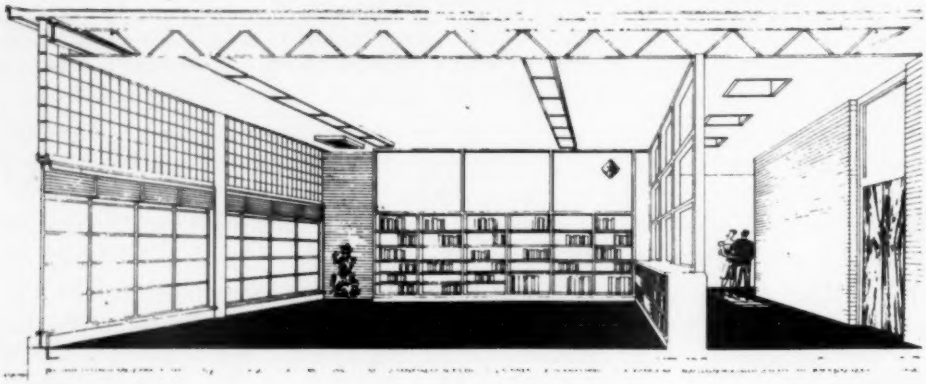
Mr. Stephens graduated from Georgia Institute of Technology with Bachelor of Science and Bachelor of Architecture degrees. Since becoming a licensed architect in 1950, he has been in partnership with his father, Burett H. Stephens. In the last five years the firm has executed over 44 school projects throughout eastern North Carolina.

POSTWAR growth in the New Bern, North Carolina, area has placed a heavy burden on the city's already overcrowded school plant. The community responded to this dilemma by voting a two million dollar bond issue. With this sum, supplemented by state and Federal funds, a program of school expansion was begun which reached its culmination with the erection of the Trent Park Elementary School. When planning of the Trent Park School was begun, the school board and Superintendent H. J. MacDonald were able to draw upon the experience of several completed building projects.

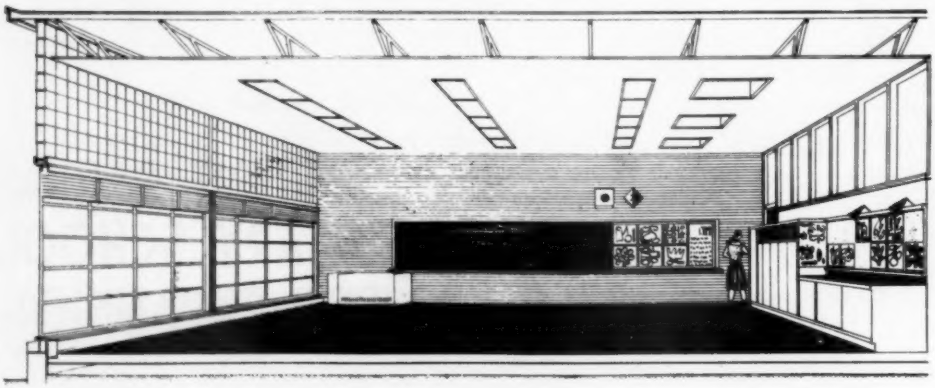
The school was to be located in a new housing development known as Trent Park. The architects, Burett H. Stephens and Robert H. Stephens of New Bern, were engaged before the site was selected. There were three available locations from which the school board members were to make the final selection. They were guided in this decision by the recommendations of a representative from the North Carolina Department of School Planning. This representative, together with the architects and superintendent, analyzed the desirable features of the three pieces of property from both the educational and construction standpoints. The site finally chosen, eleven acres in size, is generally level, draining off to a low point along the northeast corner.

Tentative Cost Established

The superintendent and the architects worked together to establish a tentative cost for the proposed building. They studied the results of various methods of construction used in other buildings. Materials, whose characteristics had proven most satisfactory from a maintenance cost analysis, were listed. Finally, the approximate size of the building was estimated. These steps were taken in a general and exploratory way and



The library has space for 1,575 books. There is an outdoor reading area on one side and a corridor on the other. The library is large enough to accommodate the needs of any additional pupils to be housed in the future.



Natural lighting in the classrooms is achieved with glass block panels, glazed sash and skydomes in the ceiling along the corridor wall. Concentric ring, incandescent fixtures supplement the natural lighting. Built-in fixtures include a cabinet sink, wardrobe cubicles and teacher's storage space.

no definite decisions were made until the first sketches were drawn.

By having the architect participate in the initial planning of the school, the client benefited from the ample time thus provided the architect for detailed study. Superintendent MacDonald was also able to consider his school needs more thoroughly and he came in contact with the construction problems in their earliest stages. This preliminary planning resulted in the allotment of $200,000 as the budget for the new school building project. The total cost (exclusive of fees and loose equipment) of the building actually amounted to $192,400, within 3.8 percent of the original estimate.

Expandability of the School

The most apparent feature of Trent Park Elementary School is its expandability. The site location is on the extreme periphery of the area's residential development, but is in the direct line of present municipal growth. It was assumed that the land surrounding the new school would be soon developed. Two other school projects in town had been enveloped by new housing before they were completed. Expandability, as a planning function, necessitated a higher original outlay in order to provide services for future classrooms in the initial construction. Also, the design demanded that areas be set aside for future additions with a minimum of reworking or connecting to present facilities.

It was the desire of the architects to provide an educational plant that would be a pleasant introduction for a child to school life. Complicated corridors, overpowering spaces and repetition of such items as similar doors that might confuse a child were to be avoided. The child's acquaintance with a school building and the surrounding areas should come gradually. The entire layout should unfold naturally, with the school providing a spontaneous and pleasing environment for the child. True, it would take more than just a building to accomplish this, but all participants in the Trent Park Elementary School project were aware that the building could be planned to do its share. Features such as direct access to primary areas from separate play areas and bus loading docks, color keying of doors and low ceilings all became part of this planning for the experiences of the child.

The First Scheme

The first scheme studied was an open plan with separate units for the various age groups. This seemed to provide all the advantages desired; however, certain obstacles were encountered. The project became too large and tended to swallow up the children. It appeared that there were many ways for a child easily to get lost or confused. Also, although the climate in New Bern is not severe, it does get quite cold in the winter months. With the grade school programs requiring children to move from their rooms to various parts of the building, the possibility of needing exten-

sive enclosed corridors led to the abandonment of the scheme.

A reversal in planning was made, with emphasis on simplicity of circulation and a minimum of corridor area. The primary rooms were to retain their individuality apart from the main sections of the school. This direction of thought led to the final basic plan of Trent Park School. Once the basic plan was established, past experience came into play to fill out the details. The resulting design was not so much an innovation or introduction of new construction methods but, rather, it was contrived to catch up to and further refine the advances in buildings of recent years.

The Final Plan

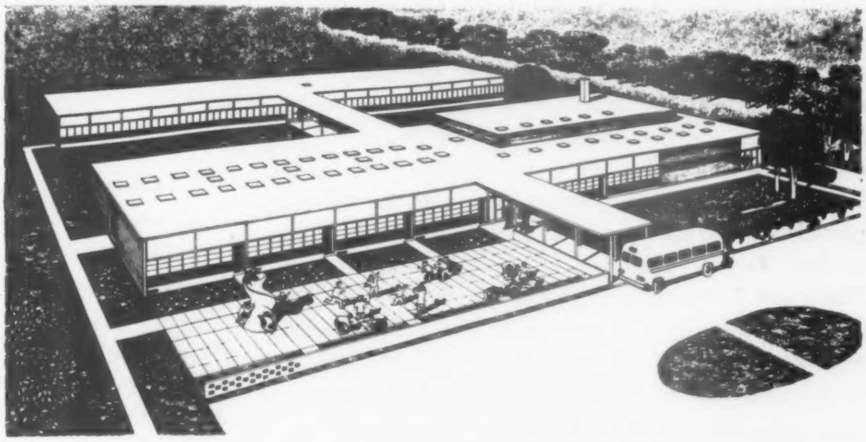
The final plan is very compact. The simple rectangular shape allows only 16.3 percent of the total area for circulation. Expansion will be accomplished with a series of single loaded corridor additions paralleling the main nucleus and connected to it by short covered walks. Separate entrances, one for children and one for administrative purposes, will increase in value as the school grows. No student traffic will pass by the administrative offices. Primary rooms face the front of the building, their playgrounds being separated and defended from the public and vehicular traffic by a masonry fence three feet, four inches high. Parents of primary children may discharge their children from cars in front of the school and watch them enter their rooms through the primary play area.

In order to obtain the maximum natural lighting effect with a minimum of solar heat gain, directional glass block was selected. The use of this material might tend to give a room a closed cubicle effect, thus losing any opportunity to open up the space to the outside. It was decided, therefore, that the normal size of vision strip was not enough, and the sash was extended to the floor. A spatial feeling of oneness with the out-of-doors could thus be obtained.

The extension of the sash to the floor immediately brought forth certain complications, principally for the heating engineer. A unit ventilator system of forced air was finally selected because it appeared to insure a positive blanket of warm air to counter cold air flowing down from the sash. A duct under the floor was considered impractical because of the dirt problem. After considerable investigation, the perforated duct usually placed under sash at window sill height was incorporated in the baseboard in much the same manner as at sill height. A special duct arrangement was contrived which allows the unit ventilator to deliver one-half of the air at floor level. The remainder is circulated directly into the room from the cabinet at the front wall.

Three Sources of Natural Light

Natural lighting is from three sources—glass block panels, the glazed sash and skydomes in the ceiling along the corridor wall. The corridor wall is glazed to ceiling height from a line above the door. The building has an east-west orientation of classrooms, a generally accepted standard in this area. Direct sunlight during school hours will be encountered only along a narrow strip of floor area adjacent to the outside wall. The quality of light exhibits some warmth of tone all day because of the overhead lighting, and the directional rays from the sunlight side tend to pass across the corridor to the opposite classrooms. Natural light is supplemented by concentric ring, incandescent lighting in all areas except the library and administrative sections where fluorescents are used.

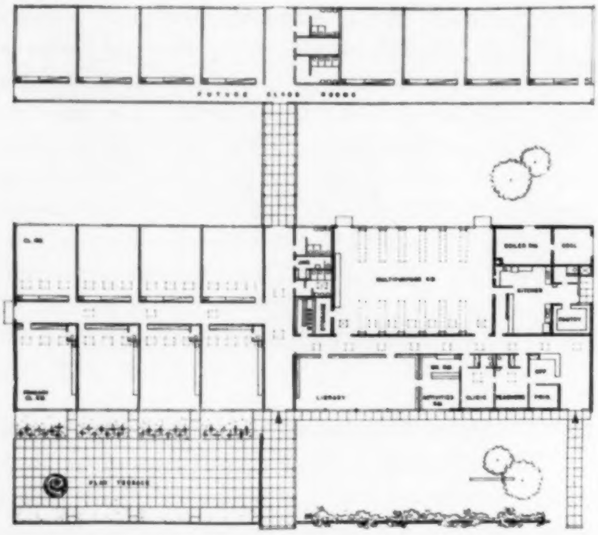


The simple, rectangular shape of the Trent Park School allows only 16.3 percent of the total building area for circulation. There are separate entrances for the children and for administrative purposes.

For visual aids instruction in the classrooms, the rooms are dimmed with draw drapes on a track closing over the entire glass wall. Each skydome is equipped with a shade.

Built-in cabinets with sink, wardrobe cubicles and teacher's storage space are designed to store various miscellaneous articles. Both the school superintendent and the educational planners of the North Carolina Department of School Planning contributed to the planning of these features.

The asphalt tile floor covering in each primary room contains the picture of a clock eight feet in di-



Primary classrooms adjoin a wide play terrace. The library and administrative spaces are across the corridor from the multi-purpose room and service areas of the building.

ameter with numerals, and a pattern of the letters of the alphabet is grouped around the edge of the work area on the two inside walls.

The library is somewhat large for the present eight rooms; but, as the school grows, the unit must accommodate the additional pupils to be housed. The entire length of the corridor wall is glazed above low bookshelves. The exterior wall is similar to that of the classrooms. Both end walls contain shelving. Space for 1,575 books on a basis of seven books per linear foot is provided in the library proper, with an additional 1,075 volumes in the conference and special reading room. There are 126 square feet of tackboard in the room. An open atmosphere is achieved as the library reaches out into the corridor on one side and into the outdoor reading area on the other, making this room the most attractive area in the school.

The multi-use room seats 144 children at in-wall tables. All seating is by folding chairs. Four hundred seats can be placed for assembly purposes. A folding platform is at one end of the room for elementary school programs and presentations.

Designed for Children

An environment which is pleasing to children has been further achieved through the use of color. Bright colors against a strong neutral background are used in the primary rooms. Here, more attention is given to the environmental standards than to particular light reflectance values for optimum close work. The elementary room colors were selected with emphasis on the latter.

Each primary room is color keyed on the corridor side as well as the outside to aid younger children to identify the doors. Tile wainscot colors vary in panels along the corridor and a five color pattern is used on the wainscot at the library.

Materials and finishes were selected on the basis of maintenance factors. Sash and entrance doors are aluminum. All eaves and flashings are copper. Ceramic tile wainscot is door height in the corridors; lobby and entry walls are smooth face brick. It was found that ceramic tile did not differ appreciably in cost from structural glazed tile for these same surfaces.

Corridor and toilet floors are terrazzo. Kitchen floors are quarry tile. Asphalt tile was selected for the classrooms because the higher price for other resilient tiles has not seemed to produce a corresponding reduction in maintenance costs.

The building is of bar joist construction with a gypsum deck and acoustic tile ceiling. Partitions are load-bearing concrete masonry with the rough texture exposed. Resin paints are used on the interior concrete masonry. All exterior and interior brickwork is of smooth face red brick.

Costs of the Building

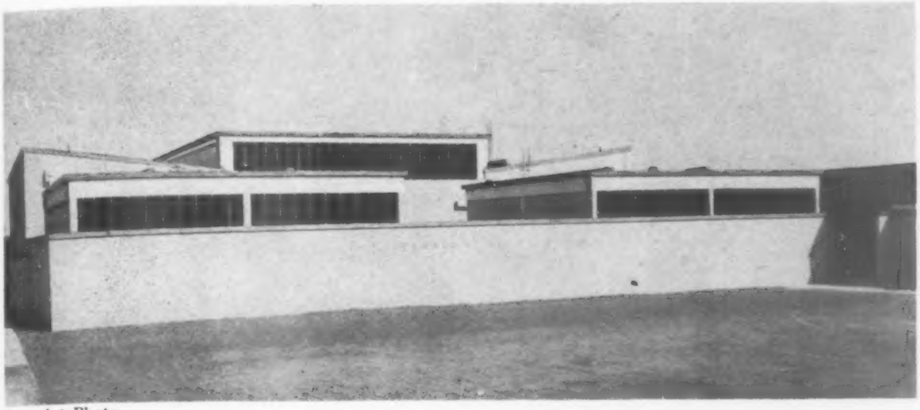
The heating system is coal-fired hot water with wall vectors in the areas other than the classrooms and multi-use room. The construction costs of the building, exclusive of site and architects' fees, are as follows:

General Contract	**$139,800**
Plumbing	**18,500**
Heating	**22,220**
Electrical	**11,880**
Total	**$192,400**

Area	**20,840**	**sq. ft.**	**@**	**$ 9.23**	**per sq. ft.**
Cubage	**276,550**	**cu. ft.**	**@**	**.70**	**" cu. ft.**
Pupils (present)	**240**		**@**	**805.00**	**" pupil**
Pupils (future)	**480**		**@**	**534.00***	**" pupil**

***Area of projected classroom wing is computed at same unit cost as portion under contract.**

As the Trent Park Elementary School building, now being erected, begins to take shape, it appears to be more and more of a bargain in educational plant as each construction step is completed.



The two music rooms and gymnasium of the Center Line High School are located at the rear of the building. The music rooms measure 48 feet by 48 feet each.

Lens-Art Photo

CENTER LINE HIGH SCHOOL— SYMBOL OF COMMUNITY ACHIEVEMENT

by PETER E. BRENDER

Engineer, Brender and Van Reyendam, Wayne, Michigan

Mr. Brender is a registered engineer in Michigan and is in partnership with Dirk Van Reyendam, an architect, for the practice of engineering and architecture. He is a graduate of the University of Michigan, and also has a master's degree from that school. Mr. Brender completed many education courses at the university and has found this background helpful in his school planning activities.

THE Center Line High School, Center Line, Michigan, is the result of extensive study by a joint planning group which consisted of the high school faculty, the superintendent of schools, members of the board of education, all principals of elementary schools, PTA officers and representatives, interested parents, lay people, five students chosen by the student body, the architect and resource persons.

This school-community group was formed in 1951 as the continuation of a committee which had planned and formulated educational specifications for two elementary school buildings in Center Line—the Sherwood School with eight rooms and a multi-purpose room, and the Miller School with twelve rooms and a multi-purpose room.

We were invited in February, 1951, to attend the meetings of the school-community group. Various committees were formed, each with its own chairman and we were present as advisors and consultants. These committees were as follows:

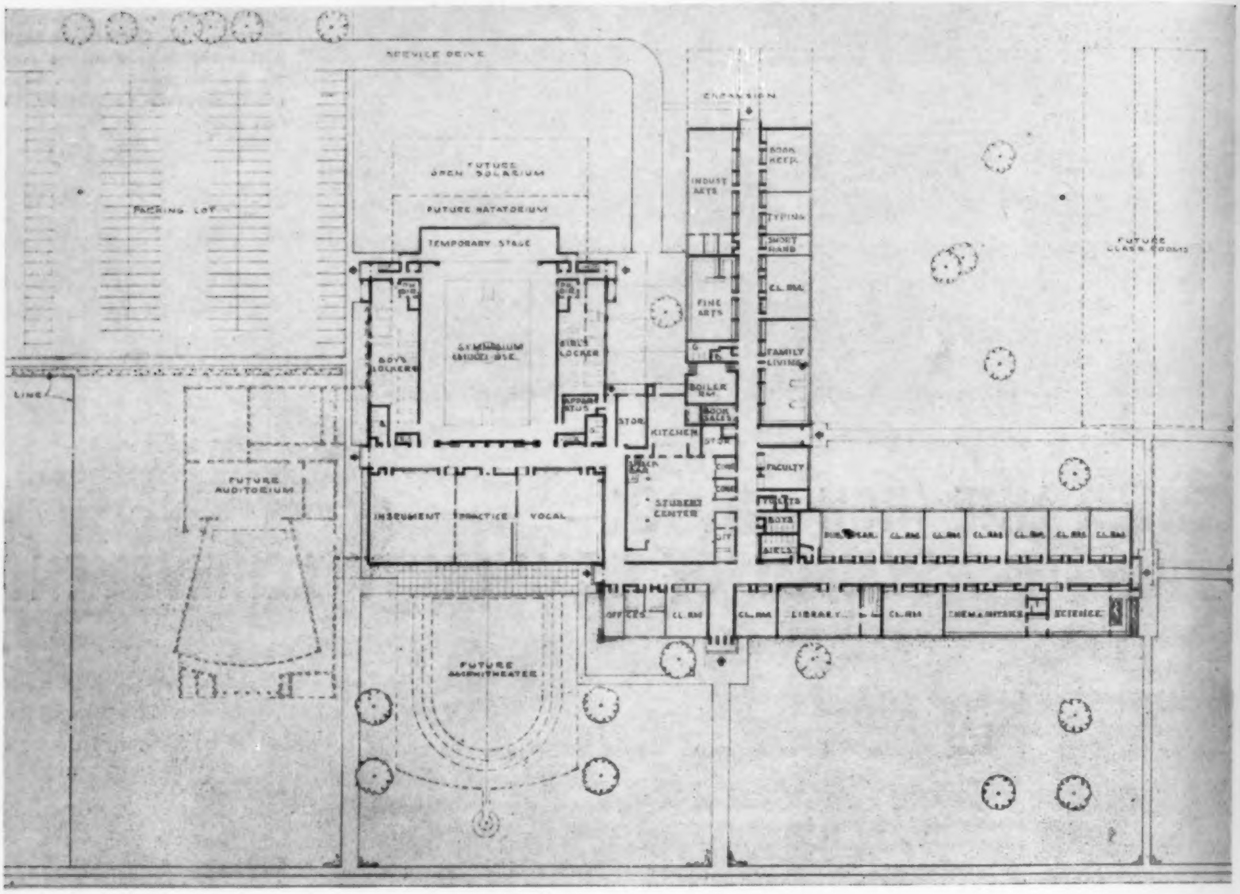
1. Site
2. Vocational Education
3. Health and Physical Education
4. Public Relations
5. Common Learnings
6. Music and Fine Arts
7. Science and Mathematics

The problem which confronted us in designing this building was to express the very definite educational ideals of the community in terms of a structure which could be built within a rather limited budget. Through certain influences, which had been at work in this community for several years, an unusually high level of community cooperation in educational policies had been established. These clear and definite ideas guided the group in drawing up recommendations for the new high school.

The Group's Recommendations

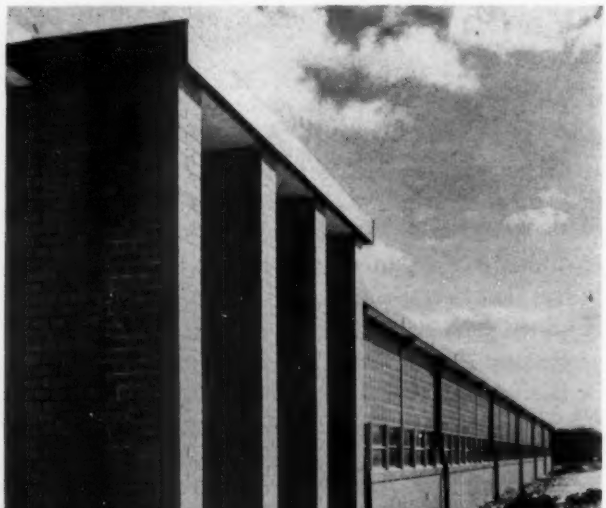
It was recommended that the school plan be educationally functional, flexible, expandable, have quality and yet be economical. Also suggested were areas for quiet work, for physical activity, for leisure and student activity, and an area for creative activities such as hobbies, music, art, learning to live, etc.

Considerable time was spent on an analysis of the



Areas of the high school radiate from a centrally located student center. Provision has been made on the site for a future auditorium, amphitheatre, classrooms, natatorium and solarium.

The side walls have clear vision aluminum sash, glass block and tinted corrugated glass. The building has a face brick exterior and painted cinder block interior walls.



present curriculum and the effect of curriculum changes within the building. The classroom developed was a laboratory type room about 1,000 square feet in size. The size, after consideration and reviewing, is actually 26 feet wide and 37 feet long, 962 square feet. The room contains a sink having hot and cold water, a work counter, teacher's closet, a display case which can be viewed from the corridor and the classroom and storage cases. The various cabinets may be removed and interchanged.

A service tunnel under the corridor provides accessibility to the gas, hot and cold water supply lines, waste and electrical extensions to each room, as required for the laboratory classroom. Metal insulated non-bearing movable partitions divide all rooms. Thus, the rooms may be reduced or enlarged in size to suit future changes in the curriculum.

The Final Plan Solution

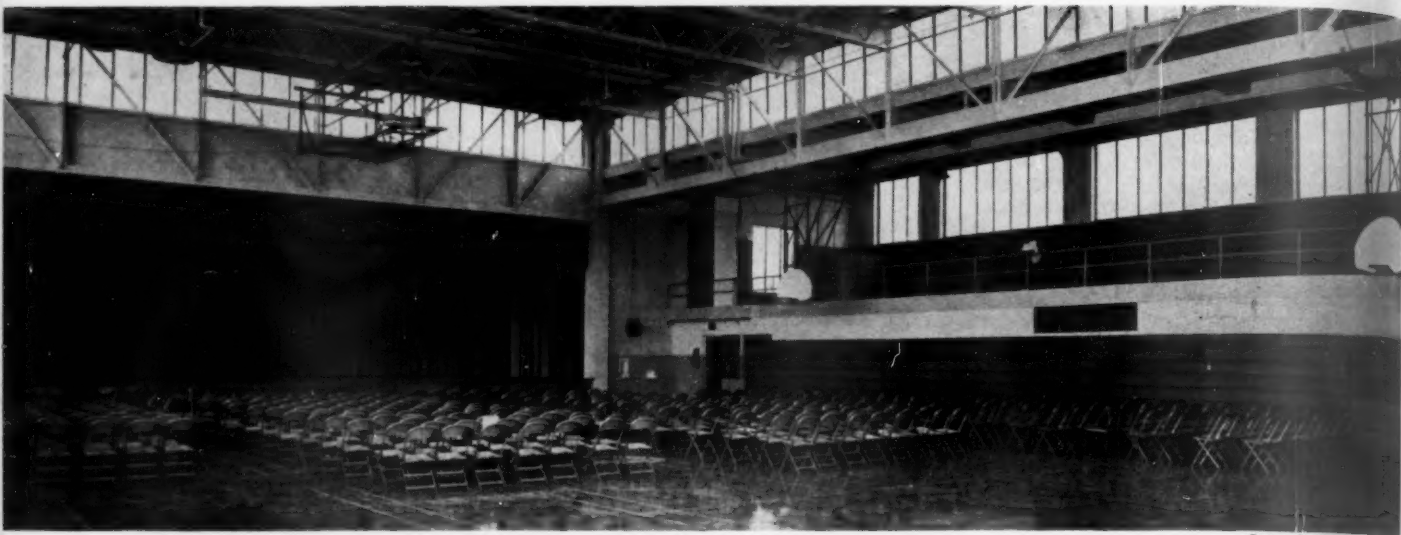
The original building solution was a campus plan with the student center as a hub. The solution which was finally developed and accepted is a connected building which retains the student center as the area

Lens-Art Photo

The student center serves as a study hall, for community activity, as a theatre-in-the-round and as a lunchroom for the pupils. The room is designed of wood to create and maintain a warm and friendly atmosphere.

Win Brunner

Classrooms have sinks with hot and cold water, work counters, teacher's closets, display and storage cases.



Lens-Art Photo

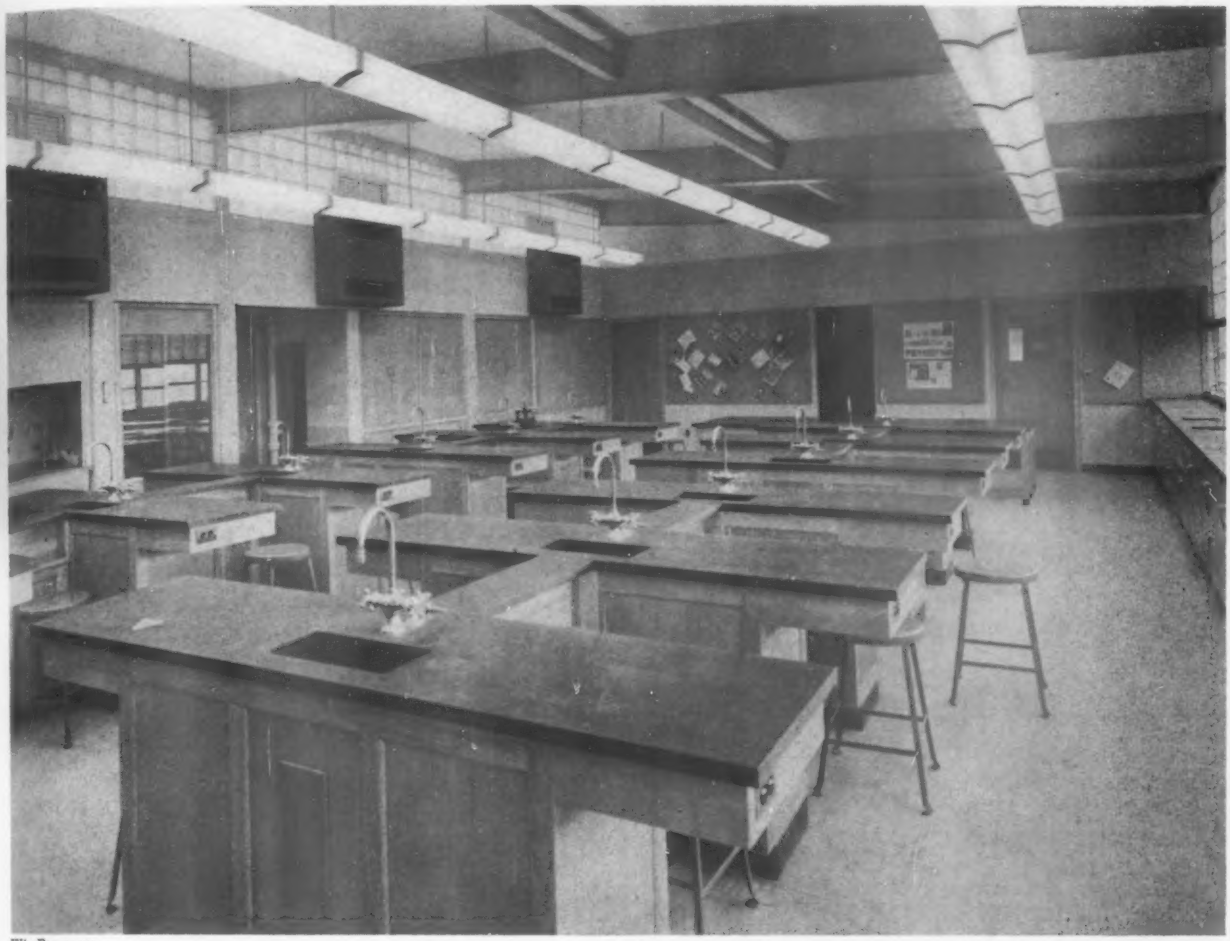
The physical activity area of the Center Line High School has a gymnasium, two playing sections with folding doors and two locker rooms. The stage is only temporary until an auditorium can be constructed.

from which all activities radiate. It is hoped that the center will stimulate the students toward a sense of responsibility and improvement of their leisure time activities. It is hoped that they will develop freedom of cooperation among fellow students, parents, the school administration and their community.

Cubicles, twelve feet by twelve feet in size, are arranged along the sides of the student center for various activities. Because of a restriction in available funds, some of these cubicles are now used for administrative offices. In the future, what is now the superintendent's office will become the principal's office. The student center serves as a study hall, for community activity, a theatre-in-the-round and as a lunchroom. It is designed of wood to give an interesting and warm feeling to occupants. The kitchen is completely isolated.

The homemaking department is well equipped with all the facilities needed to aid students in their home living activities. A laundry unit is included in this area and is complete with automatic washers.

Win Brunner



Win Brunner

Science rooms are located in the quiet work wing of the high school. Work tables have electrical outlets at each end and additional tables and sinks are at the side.

The physical activity section consists of a gymnasium, two play areas with folding doors and two locker rooms. A temporary stage is provided until such time as the auditorium can be built. Future plans call for a swimming pool to be built at the stage end of the gymnasium.

In the quiet work wing of the Center Line High School are the library, science rooms, classrooms, little theatre or public speaking room and the storage areas. The area for living includes the home and family living room, the general shop and rooms for typing, shorthand, bookkeeping, drafting and art.

The planning group felt that music stimulates self respect by giving one a sense of belonging and freedom. A great many of the students are taking some form of music. Two areas for musical activities were provided, one for voice and one for instrumental music. Each area is 48 feet by 48 feet, with storage facilities around the walls. A space, 35 feet by 48 feet, is for offices and practice rooms.

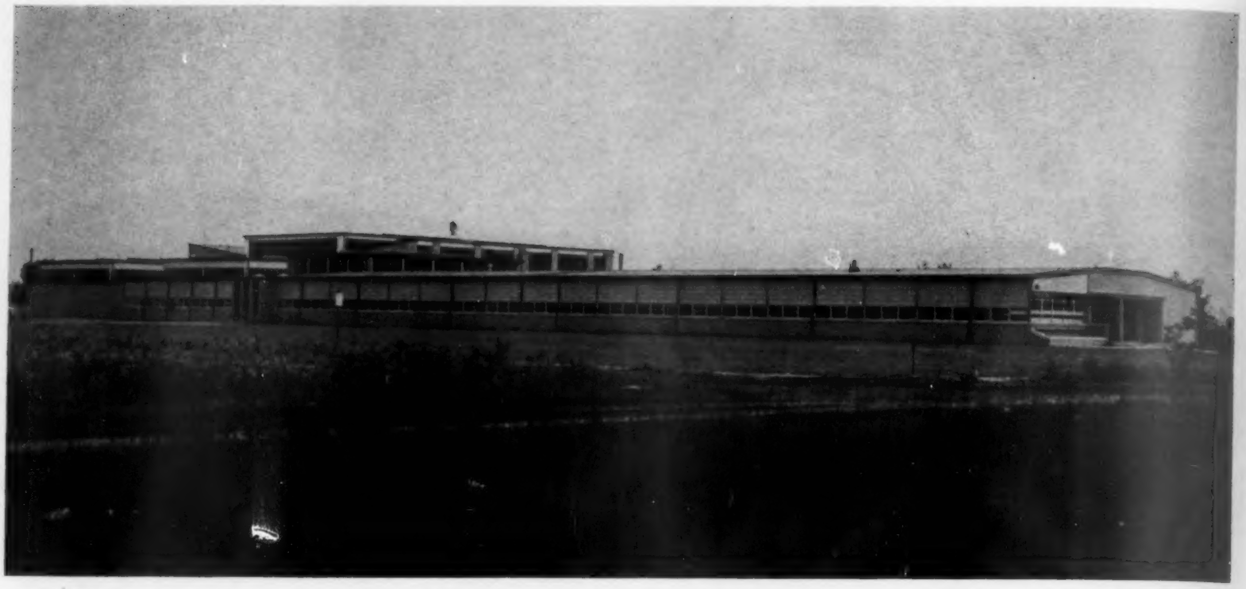
The total area of the new Center Line High School is 77,860 square feet. The building is a one story structure with exposed steel framing, concrete slab on fill, asphalt tile, face brick exterior and painted cinder block interior walls. The roof deck of the student center, gymnasium and music rooms is of wood, 4⅝-inch thick. Other areas have a precast cinder concrete deck. The entire roof area has 20-year built-up roofing.

The interior of the building has bilateral daylighting with clear vision aluminum sash, glass block and tinted corrugated glass on the side walls. The building is acoustically treated. Toilet areas have glazed tile; corridor walls are cement enamel; and locker room walls are painted enamel.

Heating and Electrical Service

The heating system is oil burning forced hot water with force-flow convectors, unit heaters and some radiant heating. Rooms have window ventilation and temperature controls. The electrical service is 2,300-volt primary underground, with a bank of transformers. The secondary current is 110-208-volt, four-wire distribution, with fluorescent fixtures, a clock system, fire alarm, interphone and limited public telephone facilities.

An auditorium with a stage shop, team room,



The ground floor area of the high school totals 77,860 square feet and construction costs came to $15.03 per square foot. Total costs of the building amounted to 1.26 million dollars.

library reading room, a housekeeping cottage and future room expansion were part of the original educational specifications for the building but, because of limited funds, these are not part of the present structure.

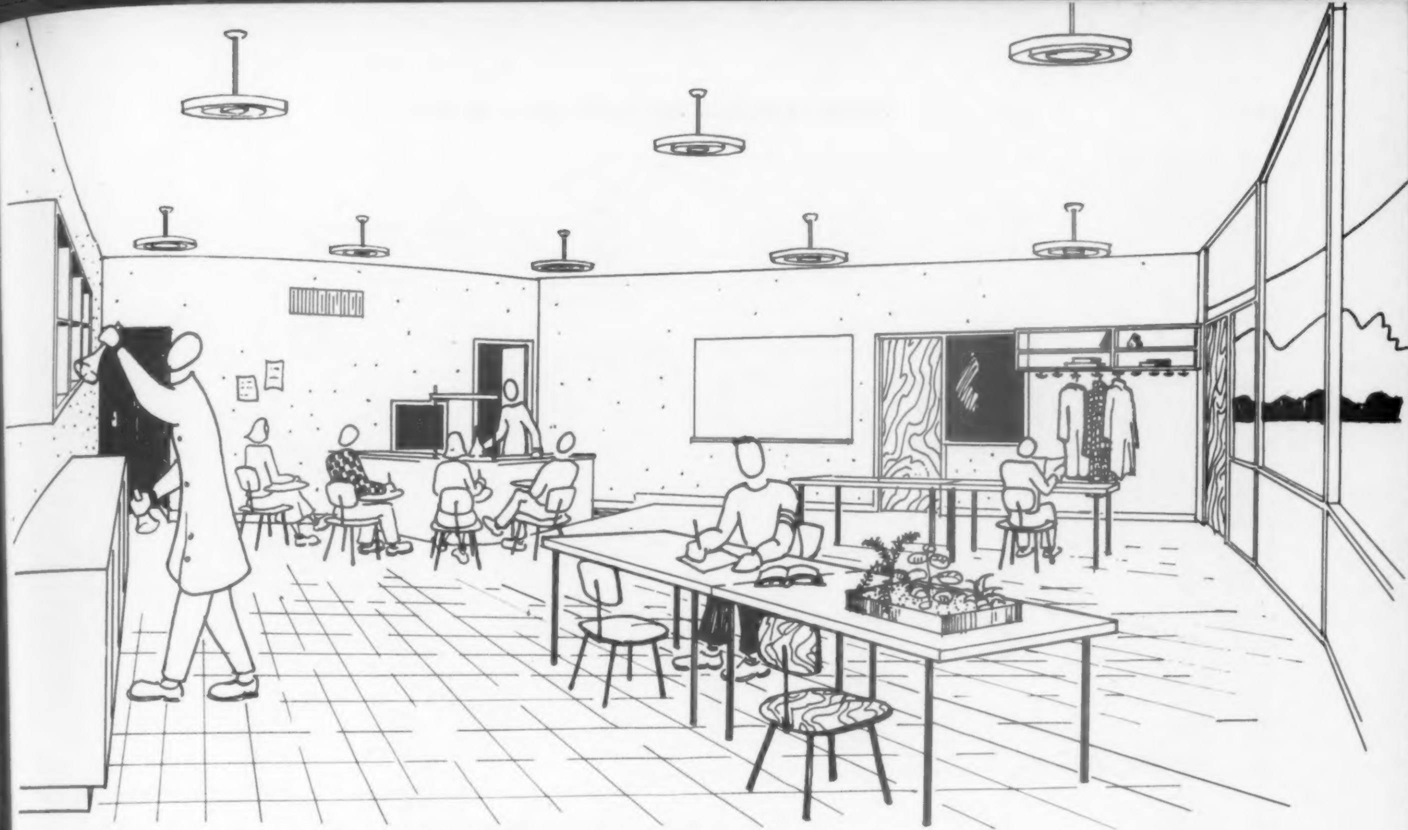
The construction costs were:

Atkin-Fordon Company General Contractor	$ 843,273.52
W. Wilbur White Plumbing and Heating	216,930.48
Hoste Brothers Electrical	99,851.62
Canton China Company Kitchen Equipment	10,363.10
Construction Costs	$1,170,418.72
Movable Equipment	66,000.00
Legal, Administration, Capitalized Interest	18,611.69
Total Costs	**$1,255,030.41**

About eight months were spent in group study and recommendations, about eight more months were spent in preliminary planning, reviewing and final approval of study sketches; five months were consumed by plan preparation, one month for bidding and three months in plan revision and rebidding. The building was ready for the high school students on September 9, 1954.

Philosophy of the School

The layout and the type of building, it is hoped, express the philosophy of education of the community of Center Line. The high school has been created as a fine instrument and laboratory for the educational staff and the community; as a contribution by the community to the development of all individuals, young and old, to enable them to be free and understanding men and women in our complex world of today and tomorrow. Education is the key to tomorrow. With it one may and will open many avenues to a rich life and true service to mankind.



The science room of the Junior-Senior High School in Old Saybrook, Connecticut, is located in the same circular unit as the foods room, home living area, clothing and biology rooms. Warren H. Ashley is the architect of the school.

A NEW TYPE OF JUNIOR-SENIOR HIGH SCHOOL FOR OLD SAYBROOK

by WARREN H. ASHLEY

Architect, AIA, West Hartford, Connecticut

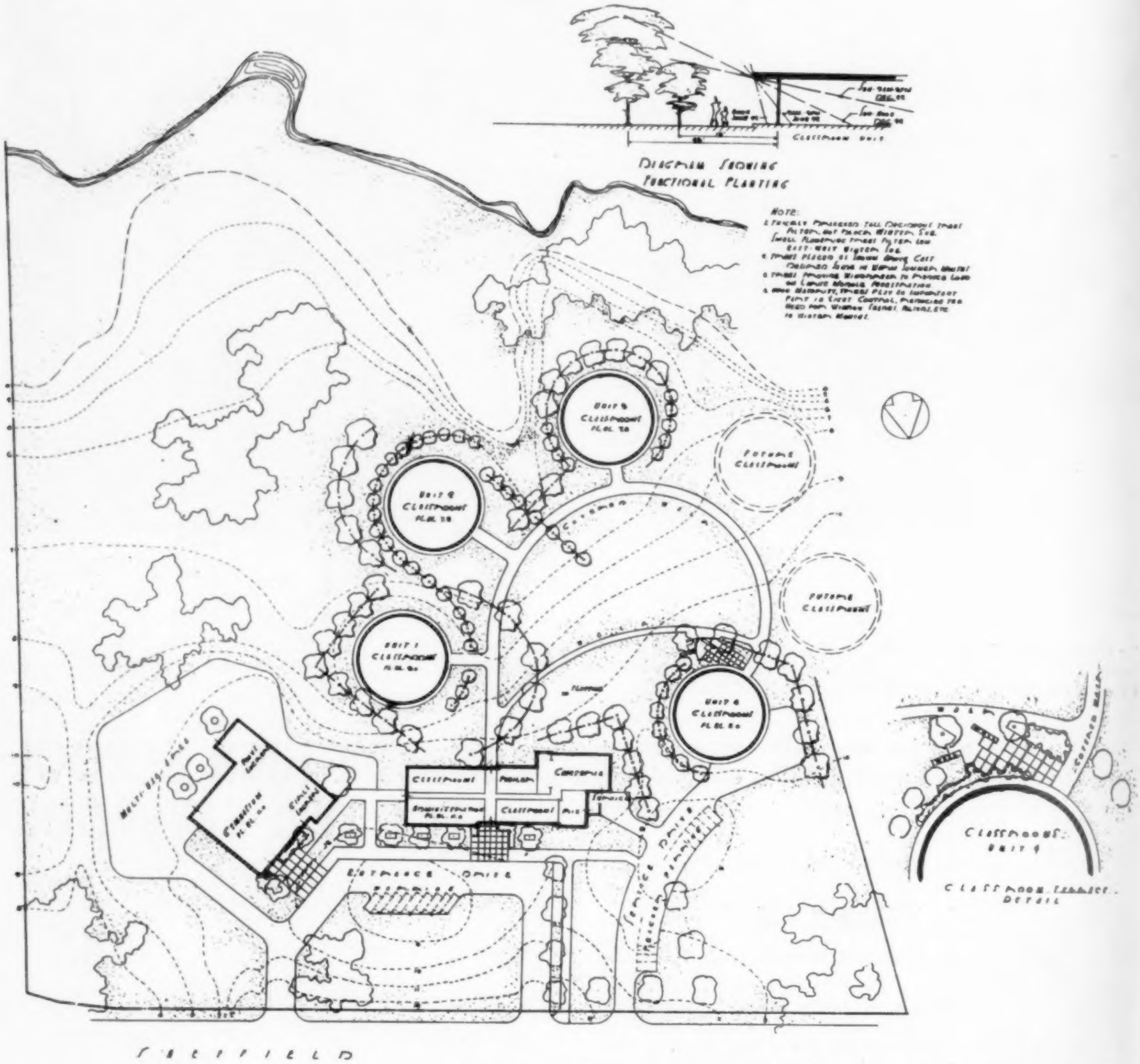
Warren H. Ashley received his Bachelor of Architecture degree from Syracuse University. He has designed over thirty school projects since World War II and was the first architect in New England to design public schools on the unit or campus plan.

THE circular buildings designed for the Junior-Senior High School in Old Saybrook, Connecticut, represent a new type of school design and plan of construction which is considered one of the most advanced in New England.

The circular unit has new and exciting possibilities for greater flexibility in the educational program. Each unit can be used for elementary classes if the need arises. Ease of teaching subjects of a related nature is made possible through the design of each unit. Protected passageways connect separate buildings and provide a pleasant interlude between classes. Absence of corridors eliminates the usual student congestion between class sessions and during the noon hour. Classrooms can be entered from the outside as well as from the inside.

Each unit is a self-contained "school within a school." Through the installation of all service elements in the center of each unit, great economies are effected. The units have their own utility cores comprising heating and sanitary facilities. Corridor space is practically done away with, and generous storage space is provided. Each classroom has the maximum amount of natural light. This feature stimulates a greater intimacy with the outdoors and creates an informal atmosphere.

The gymnasium is in a separate building, thus eliminating any interference with the academic pro-



The scientific planting of trees on the school site is designed to control sunlight during the different seasons of the year. Thickly branched, tall trees block the winter sun, small flowering trees filter the low winter sun. These trees also shade the summer sun and provide windbreaks for the fenestration.

gram. It can be used while the rest of the plant is closed, and any policing of the school area is unnecessary, especially at night. The gymnasium is located next to the administration building and is easily accessible from the athletic field and parking area.

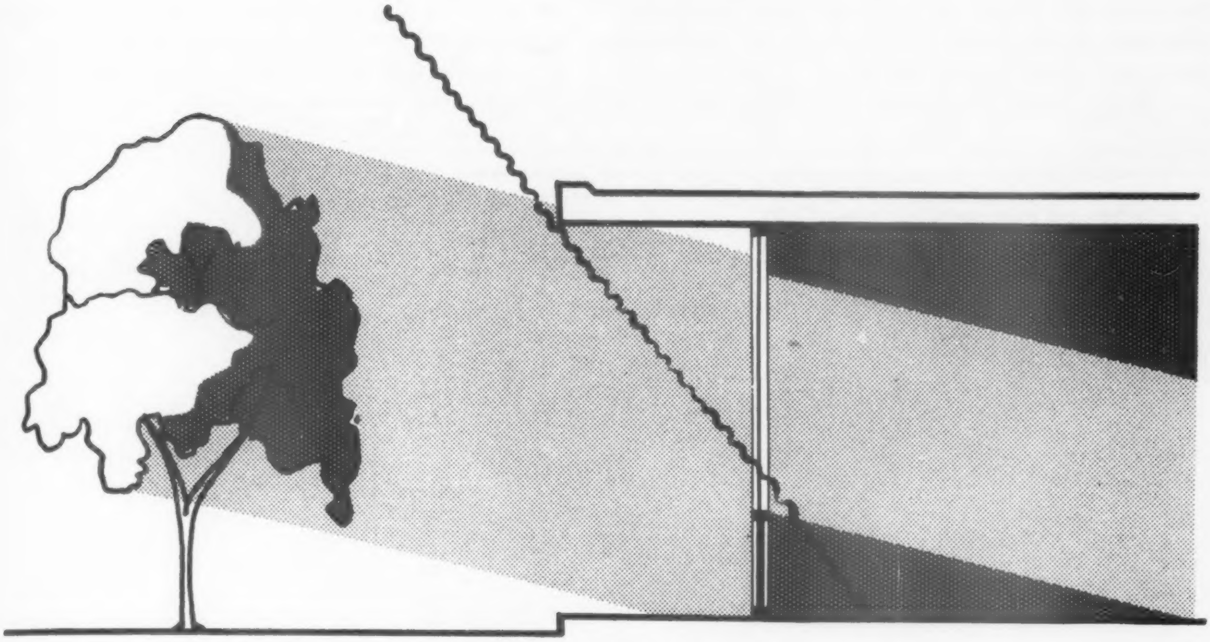
The library is situated in the academic unit near the social studies and English classrooms. Science, visual education, the photographic darkroom and homemaking are in the same unit. The music department and shop are isolated to prevent noise interference. The service entrance is adjacent to the shop areas.

The Importance of Trees

The scientific planting of trees represents a revolutionary new idea in controlling sunlight during the different seasons of the year. Trees are set in a circular pattern around each building to accentuate the unusual beauty of the design and to afford the desired light control. Small trees are planted close to the building, while medium and tall trees are planted further away. This provides the best light control throughout the changes in declination and altitude of the sun for the various seasons.

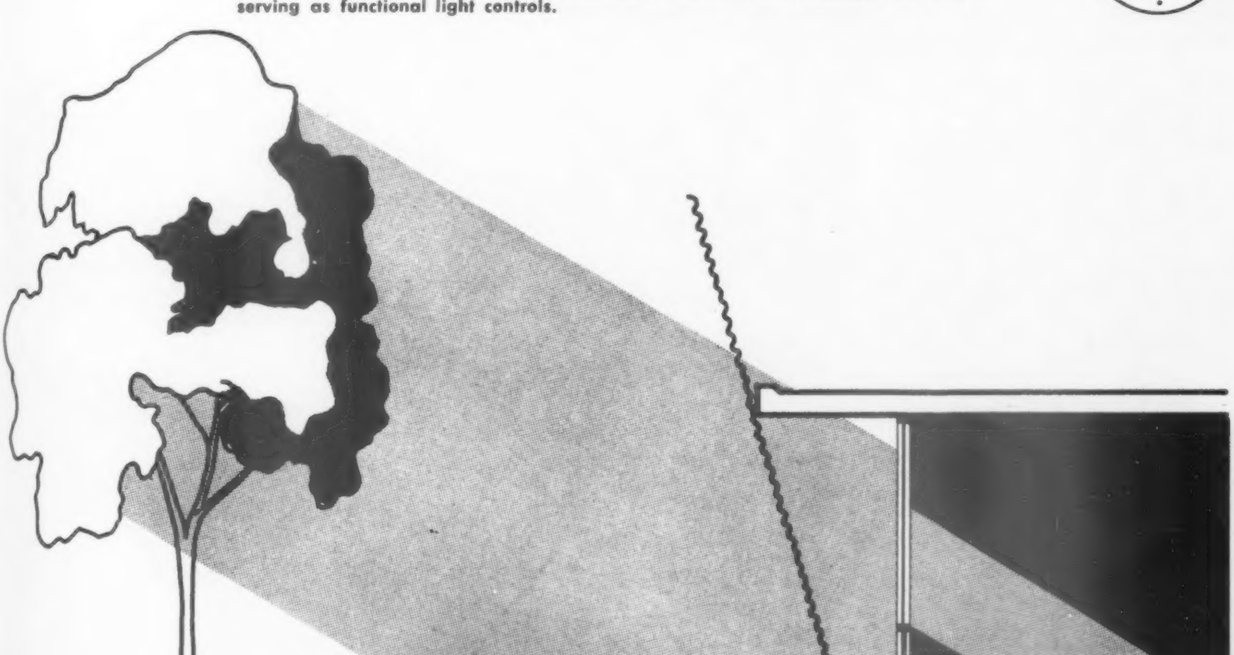
The Engineering Aspects

Each classroom unit is heated by one direct-fired, heavy duty steel furnace located in the service core of the building. Continuous circulation of large volumes of warm air within the units assure quick warm up, uniform temperatures and an instant response to the demand for a rise or fall in the temperature of each



When the trees are full grown, they will play an important role in light control, reducing the need for window shades and blinds during the winter months. At low sun time the smaller tree, planted close to the building, effectively blocks sun glare.

Medium and tall trees are planted further away from the building units. These trees provide control for sunlight during that period of the day when the sun is at its highest altitude. The trees are set in a circular pattern around each building. In this way they contribute to the overall design effect of the buildings, as well as serving as functional light controls.

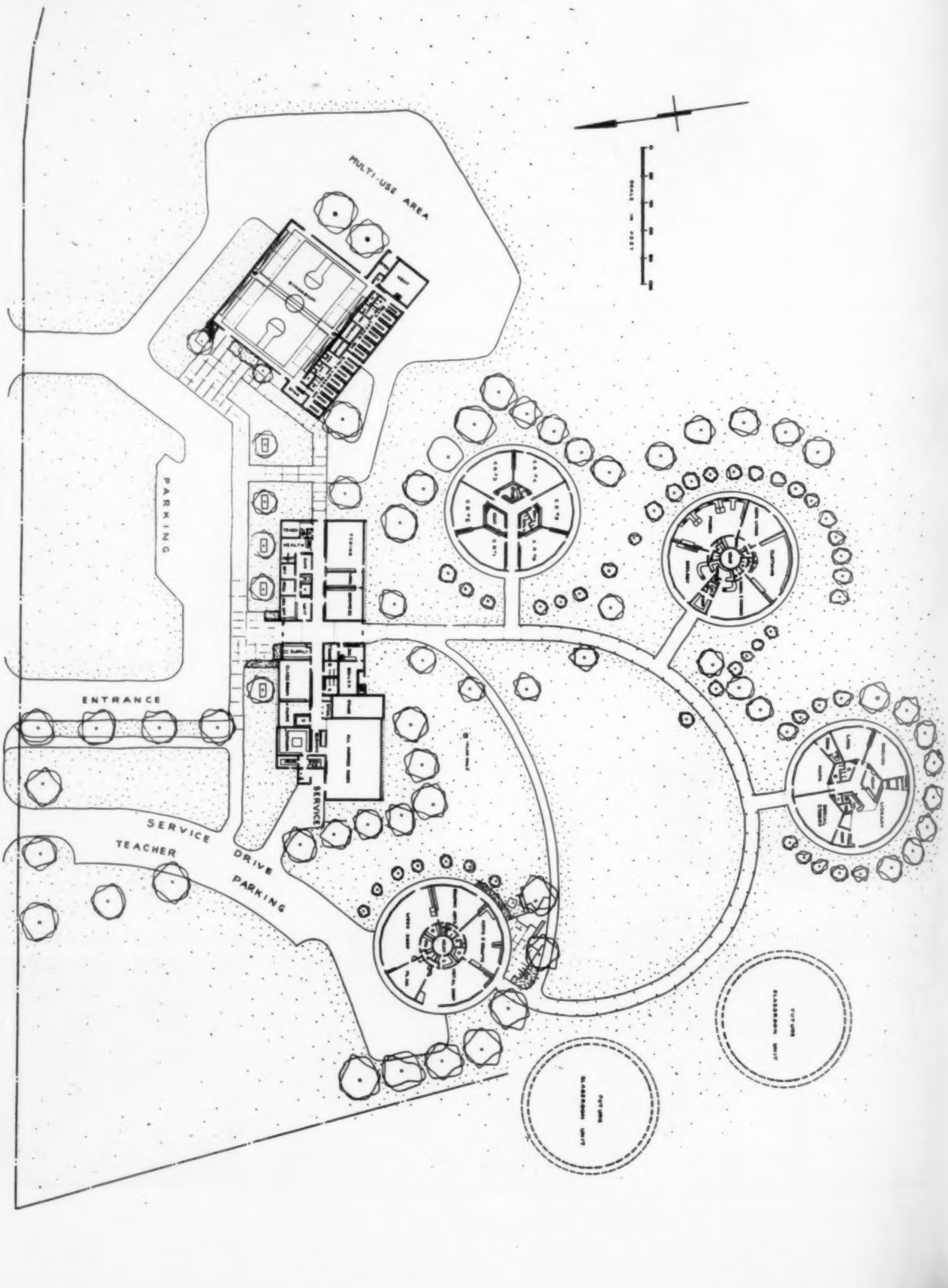


classroom, as dictated by individual room thermostats. The burners are fed by underground oil distribution lines from a central supply location.

The gymnasium is heated from a cast iron steam boiler in lieu of a direct-fired furnace unit. This makes it unnecessary to have a separate hot water heater.

Structurally, each classroom unit has a 10-inch concrete roof slab reinforced radially by two column

The main units of the Junior-Senior High School for Old Saybrook, Connecticut, are the gymnasium building, four circular classroom units and a main building which houses the administrative rooms, business education, the music room, all-purpose room, kitchen and boiler room.

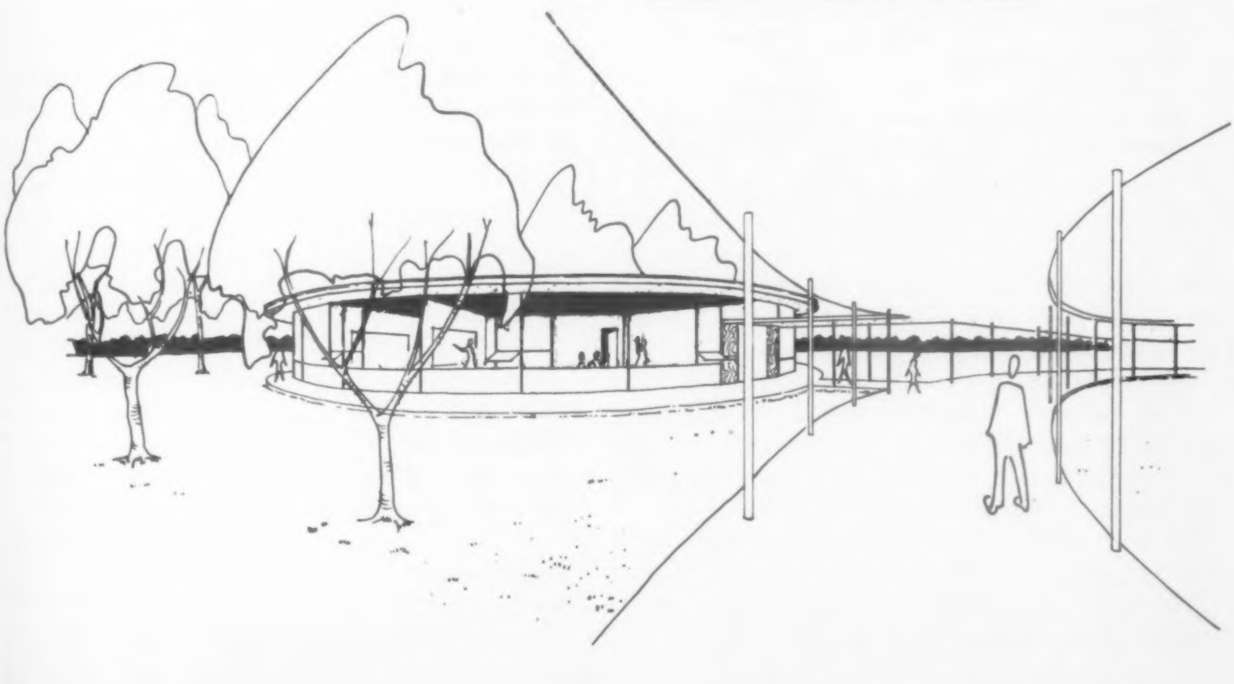


The library is located in the academic unit and is near the social studies and English classrooms. Each unit has its own core for heating and sanitary facilities. The library has ample shelving area for the books, display cases and tables and chairs for reading, studying and browsing.

bands of steel running circularly. The roof slab was poured on the ground floor slab and lifted into place with jacks, as utilized by the Youtz-Slick method of construction. To facilitate the lifting operation the diameter of the roof slab with the overhang is exactly the same as that of the floor slab, including the perimeter walkway. Thus, the entire roof slab was poured without any formwork other than the curved perimeter edge form.

A cost comparison was made of the Old Saybrook Junior-Senior High School with another junior-senior high school of equal size which was constructed in Connecticut in 1950. The breakdown of costs are as follows:

Indoor corridors are practically done away with within the various sections of the new junior-senior high school. The separate units are connected by protected passageways. Classrooms can be entered from the outside as well as the inside.



The design and plan of construction for the Old Saybrook Junior-Senior High School mean new and exciting possibilities for greater flexibility in the educational program. Each unit can be used for elementary classes should the need arise.

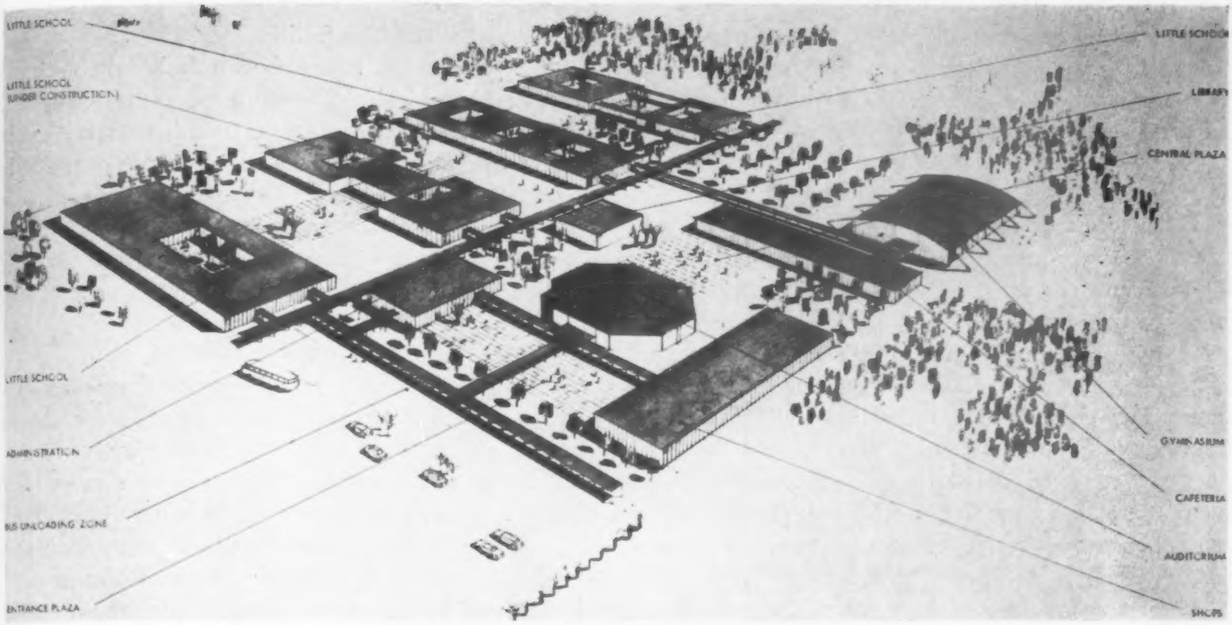
	Junior-Senior High, Old Saybrook, Conn.	Junior-Senior High, Connecticut
Date of construction	1955	1950
Number of students	600	604
Total appropriation	$940,000	$1,200,000
Total cost per student	$1,600	$2,000
Building costs	$720,945	$946,700
Cost per square foot	$13.39	$15.29
Total area	53,842	61,940
% Educational area to total area	84%	66%
Net educational area	45,227 sq. ft.	41,293 sq. ft.
Non-educational area	8,615 sq. ft.	20,647 sq. ft.

Breakdown of building costs:

General construction	$553,445	$698,700
Plumbing and heating	$116,300	$170,000
Electrical	$ 51,200	$ 78,000
Site development	$ 43,575	$108,352

What the Figures Mean

It is felt that the circular design and the construction plan for the Old Saybrook School have resulted in appreciably lower costs over those for the 1950 Junior-Senior High School. This is despite the rising costs which have been reflected since 1950 in expenditures for new buildings.



The ultimate plan for the Riverside Gardens High School is to have four little schools, each a complete teaching element for a three year high school, for a predicted enrollment of 2,000 students. Administrative and special areas will be contained in separate units.

4 LITTLE SCHOOLS + SPECIAL AREAS = RIVERVIEW GARDENS HIGH SCHOOL

by GYO OBATA

Hellmuth, Obata & Kassabaum, Inc., Architects, St. Louis, Missouri

Mr. Obata received his B.S. degree in Architecture from Washington University and his M.S. in Architecture and Civic Design from Cranbrook Academy of Art. He is a principal in charge of design in the architectural firm of Hellmuth, Obata & Kassabaum, Inc.

In a mushrooming St. Louis suburb, the Riverview Gardens, Missouri, High School represents the combined planning efforts of educators and architects to meet the seemingly insurmountable and all too common obstacle of a lack of sufficient funds to finance school building. The final solution is not only unique, but apparently will overcome this primary difficulty in an "installment" kind of building. The new conception, appearing here, is to approach the problem of a huge metropolitan type high school as a series of small units: "The Little Schools."

At present, the ultimate plan for the high school includes four such units for a predicted enrollment of 2,000. Physical advantages of such a project are manifold: construction that keeps pace with available funds, immediate occupancy of each section as completed and a plant that is flexible and can be easily expanded. Not the least of these advantages is the new freedom in planning a comprehensive spatial organization and an ideal location and orientation for the various components. Furthermore, experience so far bears out the fact that decentralized one story buildings afford opportunity for an economical type of construction.

Each one of the four little schools is planned as a complete teaching element for a three year high school, including a total of fourteen classrooms and five specialized areas for science, art and homemaking, plus administrative offices and student activity areas.

The first little school, accommodating 600 pupils, is now under construction at a cost of $362,310. As funds and enrollment increase, three more will be constructed on the 40 acre site, along with the necessary auxiliary buildings.

The Order of Construction

The order of construction, as now scheduled with the first of the little schools underway, is as follows: (1) a cafeteria designed with two student dining rooms, one of these to serve temporarily as a library; (2) a gymnasium; (3) a second little school; (4) central administration area; (5) shop, business education and music facilities; (6) third little school; (7) library; (8) fourth little school; and (9) auditorium.

As envisioned, the plan not only answers the funds versus enrollment conflict, but also results in definite educational and social advantages. The importance of this planning solution is that here the problem of the large comprehensive high school (where the individual is submerged but which contains specialized facilities), and the small high school (which cannot afford such luxuries) is finally resolved.

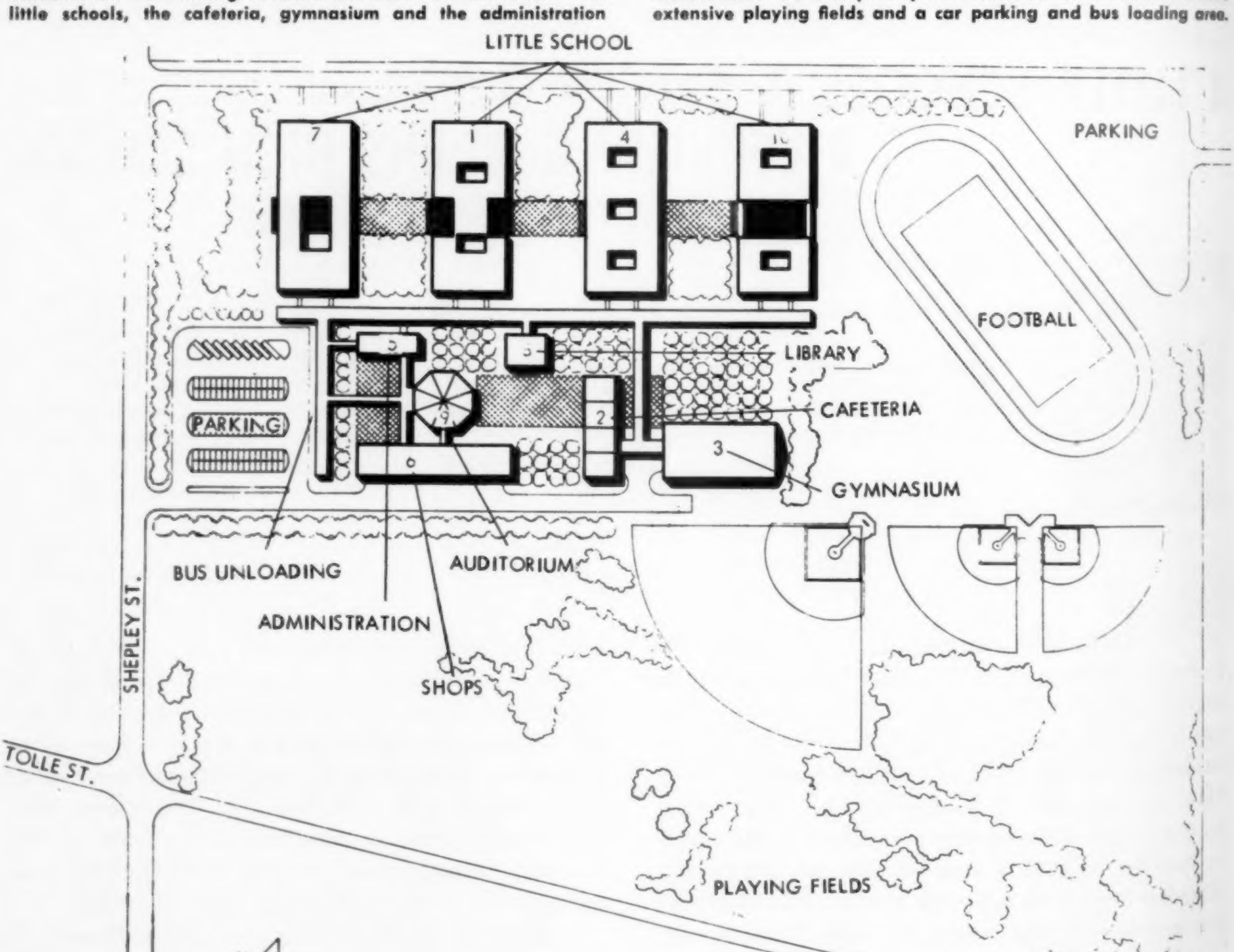
Because each little school is self-contained and accommodates only 600 students, contact between teacher and student is on a personal basis, allowing for better growth of the individual. The scale of the little school permits the student to play a bigger and more important part in his immediate environment. However, he still retains his loyalty to the larger school, fostering healthy intramural competition in sports, debating, etc.

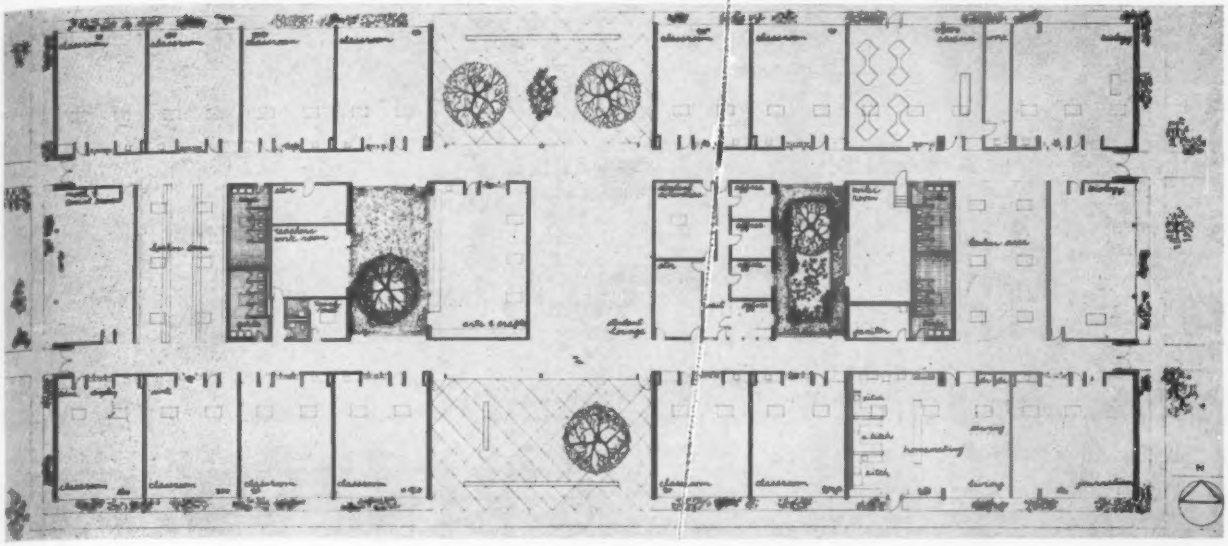
Unifying the Scheme

In addition to the overall concept, the design solution has been thoroughly studied by the architects in respect to its component parts. The selection of materials and the execution of details have likewise been handled in an effort to unify the scheme.

A departure from traditional interior school design is first evident in the corridors where the once dark, locker-lined halls now become pleasant passages. While connecting the classrooms they also open out to the

Numbers on the buildings indicate the order of construction. Two little schools, the cafeteria, gymnasium and the administration section have the first priority for construction. The site will have extensive playing fields and a car parking and bus loading area.





This little school is planned around two inner courts. Each classroom has display space and a sink. Rooms include arts and crafts, biology, science, homemaking, journalism, student activities, offices, a student lounge, a teachers workroom, mathematics, storage areas and spaces for lockers.

garden courts on one side. On the classroom side a glass display panel opens from each room. Tile faced masonry walls and terrazzo floors have been selected here for their beauty and durability. The classrooms themselves have been designed in order to utilize space efficiently and to create a pleasing environment. In addition to the display panels there are work counter spaces with sink and a generous teacher storage closet on the corridor wall.

Additional Display Space

Additional display space for student drawings is gained by attaching wooden tacking strips on one of the painted block walls. Along the exterior wall, hot water heating elements are hidden by the low storage shelves beneath the windows. Uniform lighting intensity, obtained with plastic skydomes, is supplemented by incandescent concentric ring fixtures.

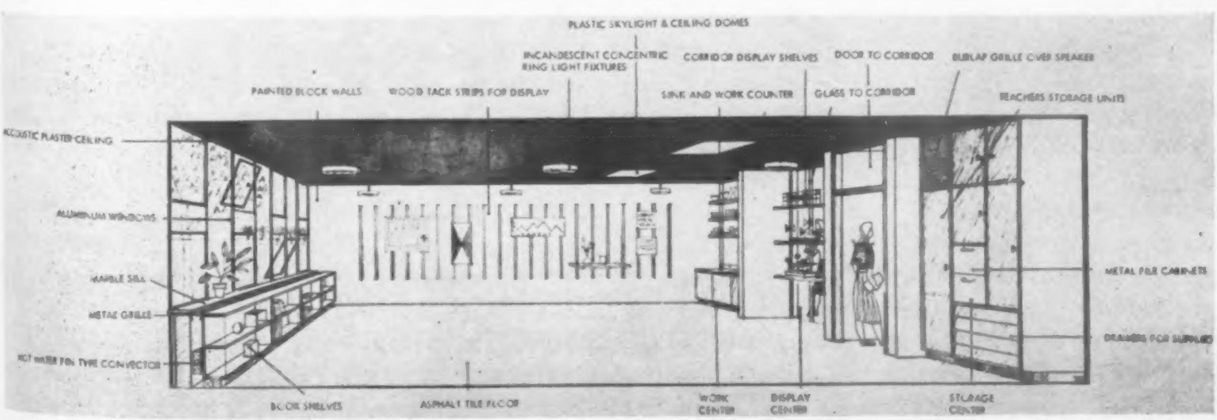
Decorative and durable materials have been selected for the exterior, with glass and colored ceramic tile panels between masonry bearing walls, and brick being used to create an open and friendly feeling.

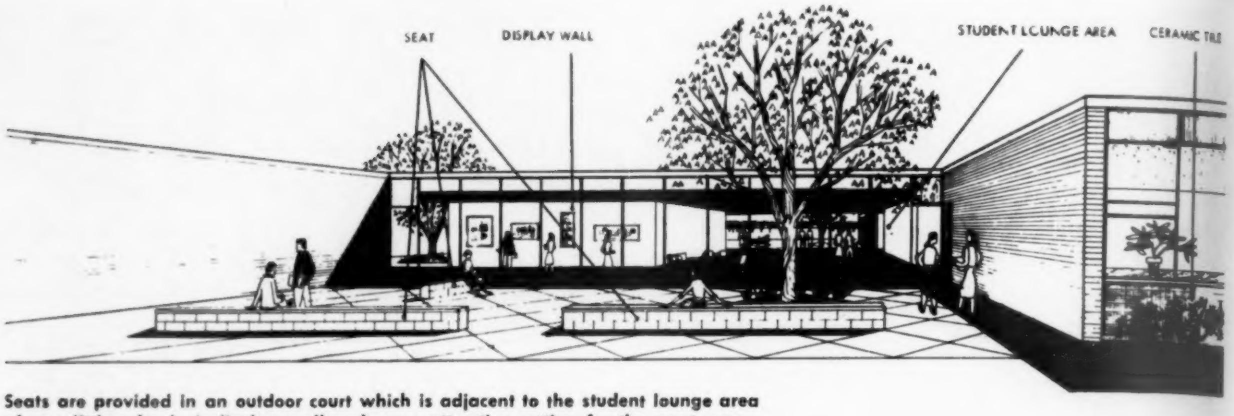
The Special Buildings

Opposite the classroom buildings, on the western half of the site, all the special buildings will be grouped around the main plaza. The library, which will accommodate 200 pupils, overlooks this area, providing a pleasant view from the inside. Here the central location stresses the important function of the library while also making it easily accessible from any building on the campus.

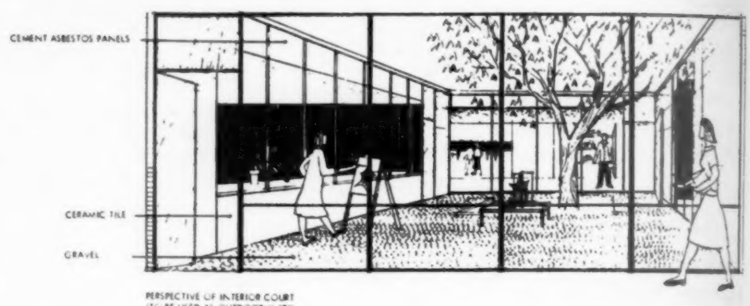
On one side of the central plaza are situated the 600-seat auditorium and shop building with easy access for both public and students. The shop building, with its large outdoor paved apron, is used to house larger

A typical classroom has bookshelves in front of hot water fin type convectors, a work center, a display area, storage units, a sink and work center, plastic skylights and ceiling domes, incandescent fixtures, aluminum windows and wood display strips.





Seats are provided in an outdoor court which is adjacent to the student lounge area of one little school. A display wall makes an attractive setting for the court space.



Another interior court is planned for use as an outdoor work area for the arts and crafts students The exterior wall has cement asbestos panels above and ceramic tile panels below the windows.

arts and crafts projects, and its nearness to the auditorium facilitates the construction and execution of stage sets.

A Lobby-Student Center

On the plaza opposite the library is the cafeteria, located near the shaded outdoor lunch area and the gymnasium. The lobby of the gymnasium, functioning additionally as a student center, is the hub of social activity for the little schools. It opens onto a landscaped terrace, which in fair weather serves as the social gathering place. A provision such as this in a campus type school cannot be overemphasized in its importance to student life. Playing fields, a football field and parking area for athletic events are planned near the gymnasium.

Architects and Consultants

The architects on the project were Hellmuth, Obata & Kassabaum, Inc. of St. Louis with Mr. W. P. Manske as associate architect. The educational consultants were Engelhardt, Engelhardt and Leggett of New York City and Mr. E. M. Lemasters, superintendent of the Riverview Gardens School District.

Bishop & Scott

A playfield adjoins the gymnasium and cafeteria of the Natick High School. Designers of the school are Shepley Bulfinch Richardson & Abbott and Smith & Sellew. Both firms have their architectural offices in Boston.

A HIGH SCHOOL OF MANY USES IN NATICK, MASSACHUSETTS

by ALFRED A. MAFFEO

Principal, Natick High School, Natick, Massachusetts

and FRANCIS B. SELLEW

Partner, Smith and Sellew, Architects, Boston, Massachusetts

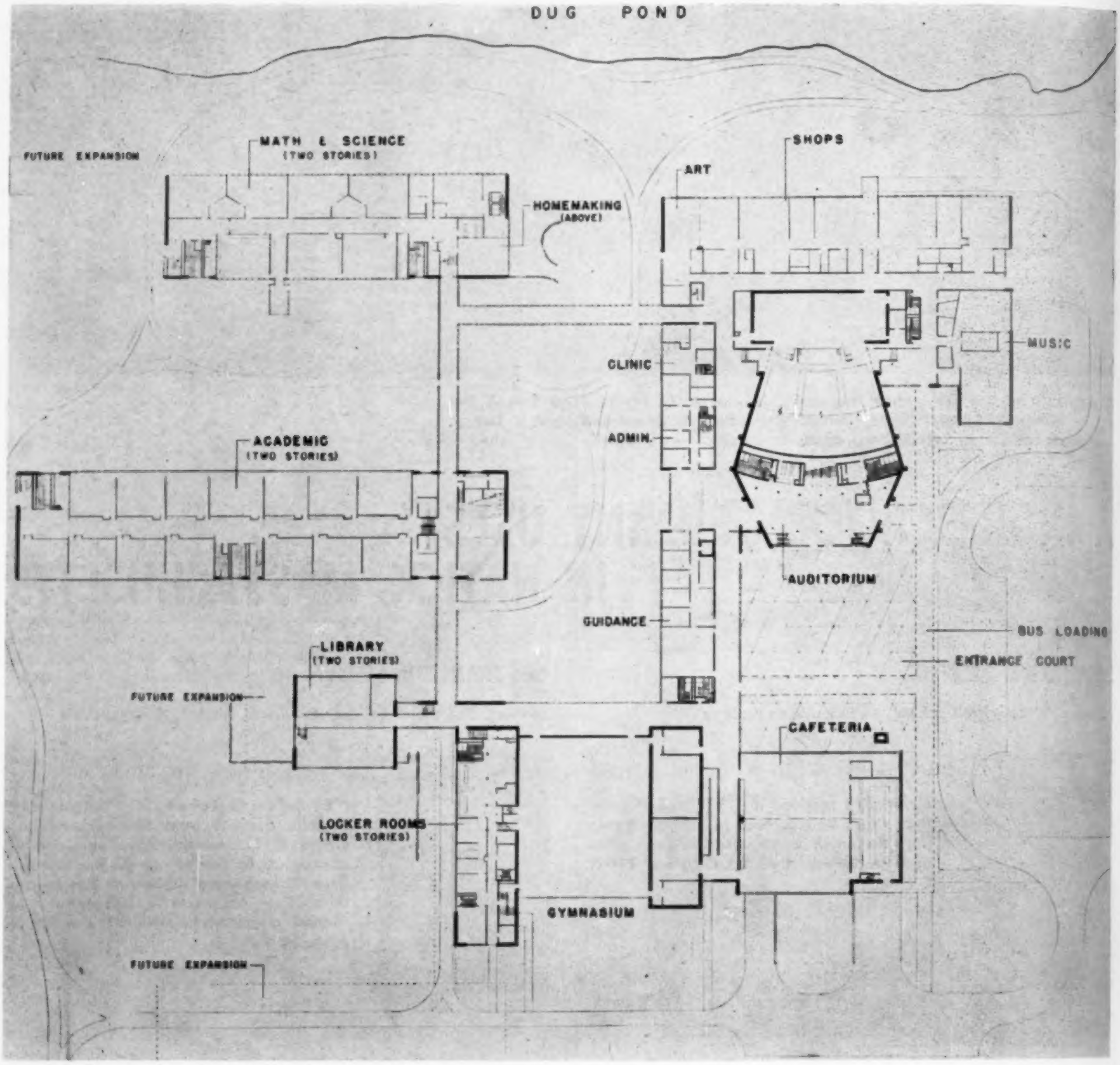
Mr. Maffeo received his Ph.B. degree from Holy Cross College and his M.Ed. degree from Boston University. He has been principal of Natick High School since 1942.

Mr. Sellew received his B.Arch. and M.Arch. degrees from Massachusetts Institute of Technology. After considerable experience in the offices of Shepley Bulfinch Richardson & Abbott of Boston and with The Architects Collaborative, he formed a partnership in 1951 with St. John Smith.

THE Town of Natick lies 17 miles west of Boston, Massachusetts, and 20 miles east of Worcester, and is located approximately in the center of the population density of the state. It has excellent transportion and water facilities, and within a 25-mile radius are twelve major colleges and universities. Prior to World War II, Natick was primarily farm land with some small industries but, immediately after the war, because the town could provide rural living in an urban area, residential development accelerated faster than in any other town in Massachusetts. So great was the increase in the number of young families that the high school enrollment will increase from 500 pupils in 1950 to a projected 1,500 pupils in 1957.

A high school building committee was named by the town moderator in March, 1951, and was charged with preparing preliminary plans and cost estimates, and recommending a high school site for the voters' consideration at the next annual town meeting. At the very beginning, the chairman of the committee, Walter E. Flagg, an engineer by profession, requested that the superintendent of schools, E. Davis Woodbury, and the high school principal attend all committee meetings.

Shortly after the organization of the committee the architects, Shepley Bulfinch Richardson & Abbott and Smith & Sellew of Boston were selected. Charles H. Cushman, a retired U. S. Navy Captain, was hired as executive secretary-coordinator and was later to become clerk of the works during the building construction period. During the previous year, the Educational Service Associates, Medford, Massachusetts, had prepared an overall survey of existing school facilities throughout the Town of Natick and a forecast of the town's future requirements. At the architects' request, this same firm of educational consultants was hired by the building committee to prepare an educational program for the new school and to assist in the planning and furnishing of the building.



Natick Senior High School has an academic wing, a math and science wing, a library, shops, a gymnasium, the auditorium, a cafeteria, guidance and administration sections, a homemaking unit and spaces for art and music.

John P. Tilton, vice-president of Tufts University, Medford, Massachusetts, and Ralph D. McLeary, superintendent of schools in Jackson, Michigan, the directors of the firm of educational consultants, worked directly on this project with the building committee, the teachers and the architects.

Another early decision of the building committee was to establish a policy of keeping the public advised of all steps in the development of the educational program and school plans. Through the media of newspaper accounts, lectures, radio talks and progress reports, the building committee, the finance committee, school administrators and architects were able to thoroughly inform the public about their school needs, plans and costs.

Just before town meeting night a pictorial brochure, which summed up the recommendations of all concerned with the planning of the school, was distributed by high school students to every citizen in the community. So thoroughly informed were the voters on the evening of town meeting that they voted, by an overwhelming majority, for the school in its entirety, even though this involved the largest single appropriation of money in the town's history.

Objectives of the Program

The objectives of the educational specifications were two: general education for all pupils and a varied program geared to individual needs and differences. As the educational specifications were being

The auditorium has a seating capacity of 1,500 and is designed for civic use as well as for school activities.

transposed into architectural plans and sketches, two more controlling factors entered the design of the building. These were primarily to provide maximum flexibility for future expansion and changes in educational techniques and secondly, to coordinate the educational and athletic facilities of the school with the civic and recreational requirements of a lively, rapidly expanding suburban community.

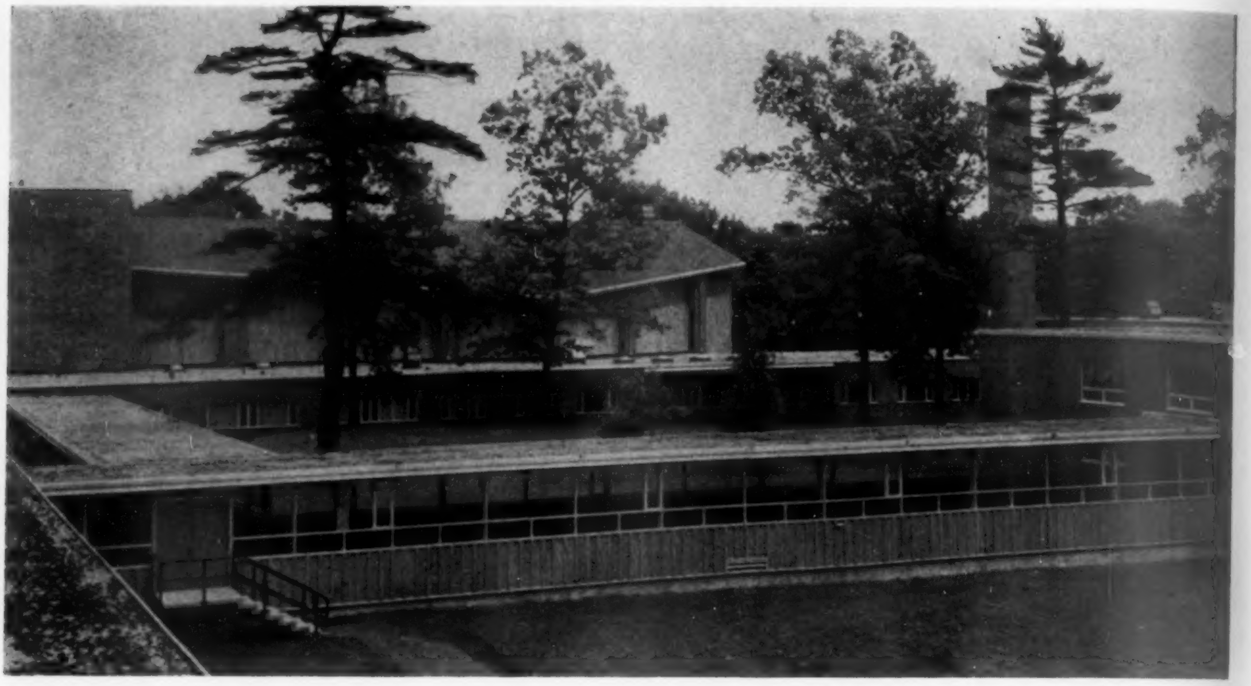
In arranging the components of the school, the architects have attempted to isolate the noisy areas, to provide a human-scaled environment for 1,500 pupils, to preserve the natural beauty of the site to the greatest possible degree, to provide for easy future expansion of the building and to permit easy and economical community use of parts of the school.

The plan of the school is developed around a central courtyard which is surrounded by a main circulation corridor at an elevation half-way between the first and second floors of the two story classroom buildings and locker rooms. At the same floor level as this corridor, and opening off it, are the gymnasium, cafeteria, auditorium, administration offices, library, industrial arts, shops and music rooms. Thus a system of pupil traffic is provided in which there is never more than a half-flight of stairs between the classrooms and the large special purpose areas of the building.

A School-Community Auditorium

The size of the auditorium, which provides 1,500 seats on one sloping floor, was established by the town's need for a large concert hall-theatre. The use of an auditorium balcony was rejected by the educational consultants because it would hamper ease of administration and safety of entrance and egress. The shape of the auditorium was determined partly by the acoustical consultants in order to reduce the acoustical ceil-

The administration office of the high school overlooks the central courtyard.



Glass-enclosed connecting passageways outline the central courtyard with the administrative offices and auditorium seen on the far side.

ing and wall treatment to an absolute minimum, and partly by a structural system which reduced the quantity of steel required by 20 percent under other designs. In addition to the projection booth at the rear of the auditorium, facilities for a portable projection booth are provided on the auditorium floor 50 feet in front of the stage. By omitting the usual proscenium, the stage can be opened to the full 60-foot width of the front of the auditorium.

The entrance court, although open to the sky, functions as an entrance lobby for the cafeteria, gymnasium, auditorium and administration areas. A terrace with benches, accessible from the cafeteria, is provided for outdoor dining.

The cafeteria, separated from its kitchen by a wall with doors, is used for a study hall and student activity meetings. Double-doored student activity storage lockers extend along one wall. A separate dining room for teachers is provided.

Gymnasium and Other Sections

The gymnasium seats 1,000 spectators on folding bleachers. The locker rooms are stacked one above the other and are each one-half level above or below the main circulation corridor and the gymnasium floor. Locker rooms for interscholastic field sports are located below the gymnasium and are provided with direct access to the playing fields, so that these athletics will not interfere with the general physical education program.

The shops and music areas have been located adjacent to the stage so that the shop facilities may be used for building scenery, and the music practice rooms may serve as stage dressing rooms.

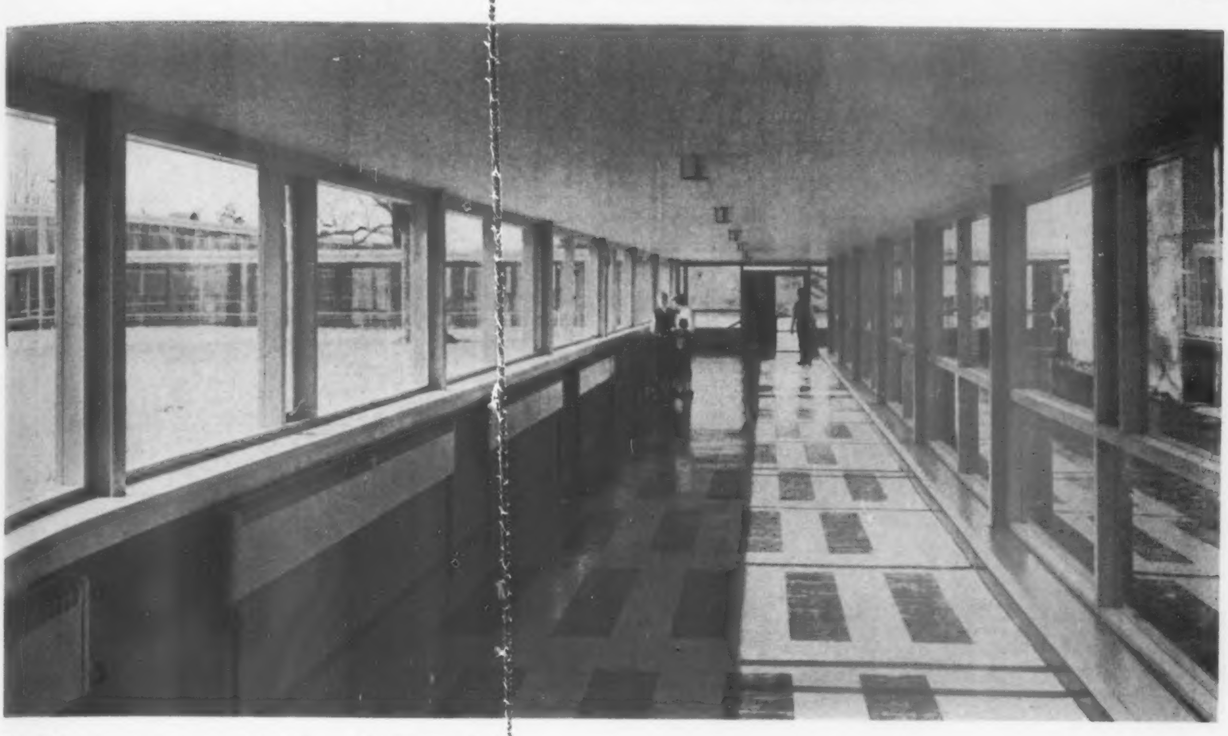
The administration area, located so that easy supervision of both the educational and community functions of the school is afforded, includes, in addition to the usual offices and service rooms, a guidance library, guidance interview rooms and a health clinic. An all-purpose room, located in the administration area, provides for the future expansion of administrative offices in the event that a two-year junior college is added to the present high school plant.

Science laboratory and commercial rooms are located on the ground floor, so that the various mechanical service lines can be located in crawl spaces underneath the floor slab where they are readily accessible for repairs and future alterations. The ground floor corridor of the math-science building is developed as a science museum.

The home economics department has, in addition to the usual cooking and sewing facilities, an all-purpose homemaking room which may be subdivided by moving partitions into a variety of arrangements of living room, dining room, bedroom and kitchen. This room is also provided with an outdoor terrace and, since it is located adjacent to the faculty rest rooms, will serve for teachers' meetings after school hours.

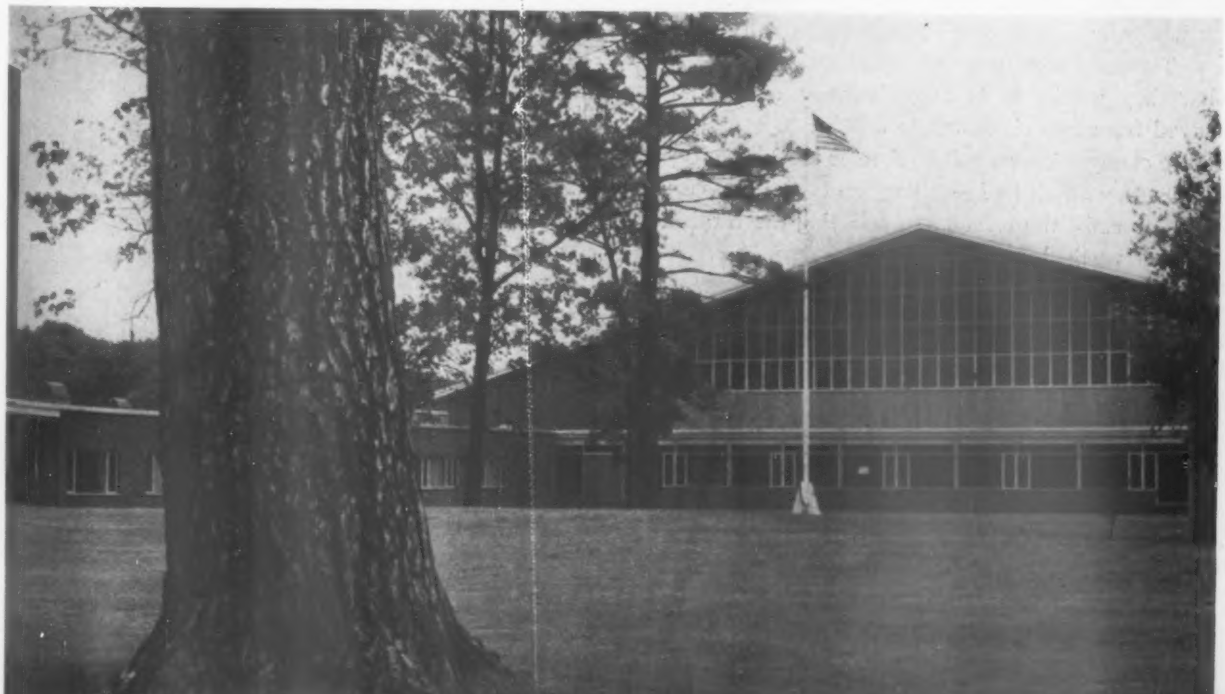
Special Classroom Cabinets

As the result of a questionnaire submitted to all teachers, eight basic classroom cabinets were designed



Glassed-in passageways connect the main areas of the building. There is never more than a half-flight of stairs of grade level between the classrooms and the large special purpose areas of the school.

The central courtyard is bounded on one side by the gymnasium unit and on the other by the administration wing of the building. The large lecture room opens onto the court. The gymnasium seats 1,000 spectators on folding bleachers. Locker rooms are stacked one above the other and are a half-level above or below the main circulation corridor.



The Natick Senior High School entrance lobby and cafeteria are at the right. A ramp leads to another entrance at a lower grade level.

by the architects to answer all the storage, display, chalkboard and tackboard requirements of all the teachers. These cabinets were designed in uniform sizes so that they would fit in any classroom and could be moved from one classroom to another to comply with future changes in curriculum. A scale model of a typical classroom with all its furnishings and cabinets was provided to assist the teachers in selecting the furnishings for their particular rooms.

Every department of instruction has its own departmental office and book storage room. The mathematics and science offices have connecting laboratory-workrooms which were also designed for the use of advanced students.

Janitors' storage and cleaning rooms and incinerators are located in every wing of the building. A ramp provides for the easy movement of supplies from the maintenance shops and large storage rooms below the cafeteria to the main circulation corridor.

Many Activities Take Place

After fifteen months of occupancy, it has become quite evident that the flexibility of the school plant has stimulated many educational and community projects. It is not unusual in good weather to see a social studies class carrying on a spirited discussion while sitting on the lawn of one of the outer courts, or to notice an English section reading from the classics on the banks of the pond, or to watch the band maneuvering in rehearsal on an adjoining playfield, or to observe a variety of art students sketching in different localities on the campus, or to see in the late afternoon hours a group of students decorating the cafeteria for a coming social event, or to see the principal in conference with a teacher and parent on a bench in the entrance court. One cold winter day, 100 or more students were enjoying ice skating while waiting to take their mid-year examinations. It has been possible to have an exchange student from France, an exchange teacher from Germany and only recently to have thirty high school students from Colorado as visitors for ten full and exciting days.

So great has been the enthusiasm of students in the use of the facilities and equipment of the new science department, that the annual science fair now has as many as 400 exhibitors and requires the space of the gymnasium and surrounding lobbies. The acquisition of a planetarium has been another stimulus to

the science pupils. Not only is this used by the high school pupils but it is being used as an introduction to science for the pupils from the elementary schools. A number of planetarium lectures have been given to adult groups. Delegates to a recent conference on nature conservation held in the new school were interested to learn that the students have established nature trails, bird-feeding stations and a weather station, and have prepared landscape schemes for additional planting in the courtyards and elsewhere on the school campus.

Community Use of Building

Beyond the use of the auditorium for town meetings, other parts of the building are in constant use by various local civic and fraternal organizations. Concerts, dances and community banquets occur almost weekly. The disposition of the various areas in the plan of the building allows many community affairs to be held at the same time. For example, one recent evening an open house for the high school staff, with an attendance of 800 parents, was held at the same time that 450 boys were having a Little League party in the cafeteria. On another evening, a college glee club concert was held in the auditorium at the same time that a high school dance was being held in the cafeteria.

Use by Outside Groups

It was anticipated that a few educational groups would use the school for meetings but the number and variety have gone beyond all expectations. State and regional organizations have found the school conveniently located and suitably arranged for their meetings. On a recent Saturday, three large and active educational groups were in session at one time—the New England Association of Mathematics Teachers, the Science Teachers of New England and the Massachusetts Industrial Arts Instructors. There was no conflict in the individual activities of these groups, and the mingling of 1,200 members of the three organizations proved mutually beneficial. On a school day during the spring, a meeting of over 1,800 physical education instructors was accommodated without interfering with the normal daily routine.

Finally, it is interesting to note that the success of this school has broken the resistance to the open, campus-like type of secondary school plan in the Boston area. This success in the planning and use of the Natick

The mathematics-science and academic buildings of the school are shown as they appear from across the pond which borders the site.

The auditorium lobby is a spacious area which opens onto the entrance court. Steel pillars are part of the unit's structural system.

High School has been achieved because the teachers, administrators, representatives of parents and the public, educational consultants and architects all pooled their knowledge and cooperatively planned a school which they believed would best meet the needs and interests of the boys and girls and the townspeople.

Areas Within the School

Natick High School houses grades ten through twelve. The room count is as follows:

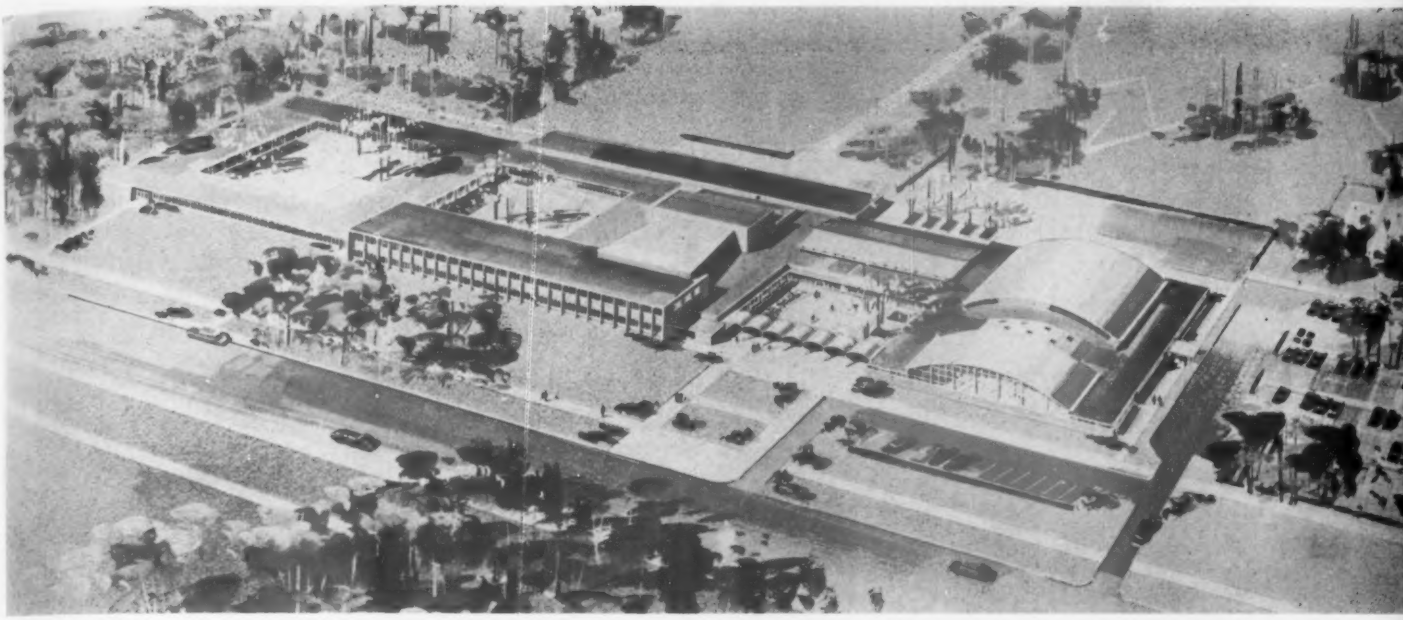
Mathematics, Social Studies, Languages, English, Commercial Subjects	38 rooms
Science Laboratories	7
Homemaking	3
Art	1
Crafts	1
Shops	6
Music Rooms	2
Total Rooms	58

In addition to the above areas there are: the library, a gymnasium with boys' and girls' locker rooms, field sports locker rooms, two special exercise rooms and folding bleachers for 1,000 spectators, a cafeteria seating 500, an auditorium to accommodate 1,500 administration and guidance offices and areas for maintenance and storage.

Cost, Area and Volume

The cost of the building, exclusive of land, landscaping, furnishings and fees, was $2,864,656. The total area is 196,039 square feet, and the volume is 2,997,250 cubic feet.

The architects of the building were Shepley Bulfinch Richardson & Abbott and Smith & Sellew of Boston, Massachusetts. The educational consultants were the Educational Service Associates of Medford, and the contractor was B. Perini & Sons, Inc., of Framingham.



Dearborn's new high school, designed to house 1,200 pupils, can be expanded to accommodate 1,800.

EDSEL FORD HIGH SCHOOL'S ADVANCE ON EDUCATION

by MARK F. SCULLY

Superintendent of Schools, Dearborn, Michigan

Dr. Scully received his B.S. from Missouri State College, his M.A. from George Peabody College and his Ed.D. from Teachers College, Columbia University, New York. Before becoming Dearborn superintendent in 1954, Dr. Scully was superintendent in Kentucky, Illinois and Missouri. He has also held positions as principal and teacher.

and EBERLE M. SMITH

Eberle M. Smith Associates, Inc., Architects-Engineers, Detroit

Mr. Smith graduated from the University of Michigan College of Architecture and Engineering in 1927. After gaining experience in several Detroit architectural offices, he entered private practice in 1935. Since 1942 the firm has been under Mr. Smith's name. The greatest part of the work of the firm has been in school design.

THE superintendent speaks: Dearborn needed a new high school. This was strikingly evidenced by crowded classrooms and enrollment forecasts, and no one could dispute the facts. But just what sort of high school was needed was a more abstract problem. As the problem was studied, it became apparent that the philosophy and objectives of the program of secondary education in Dearborn needed definition and clarification.

The planning of the Edsel Ford High School provided a rare opportunity to examine the senior high school instructional program and the result was the simultaneous launching of a system-wide secondary curriculum improvement program. Eventually, this program involved the total staff of the division of senior high schools and of Henry Ford Community College, as well as an all-city school advisory committee of 45 representative citizens.

In the beginning the two groups (teachers and citizens) met independently. After a few months each group committed itself to a belief in a common learnings program to be integrated with a specialized learnings program. It was in this matrix of self-scrutiny, research and study that the first concepts of the new high school were born.

The Board of Education then established both teachers' and citizens' planning committees to become directly involved with the planning and policies of the

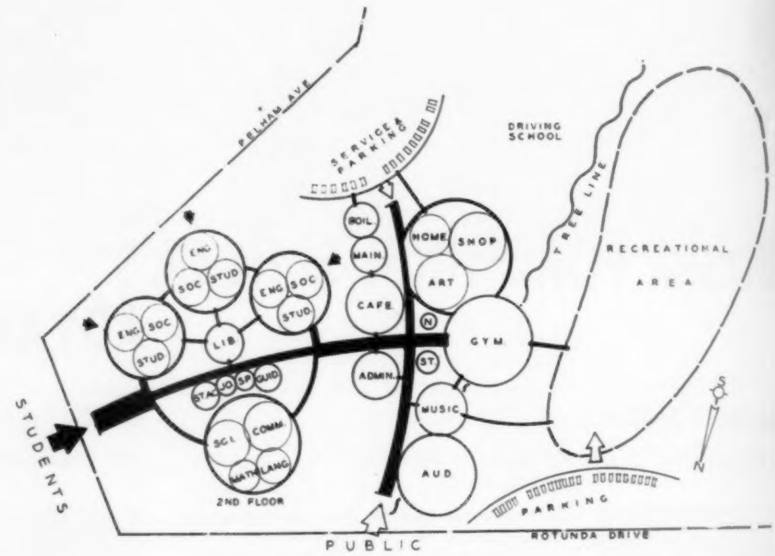
new school. The teachers' planning committee consisted of 44 teachers and administrators from the three existing high schools and the community college, who were engaged in the curriculum planning activity. These people developed the *educational specifications*, defined as a written statement of the educational objectives, activities and facilities needed for the total instructional program in the new school building. Then, in a series of approximately 50 meetings, the preliminary plans were developed.

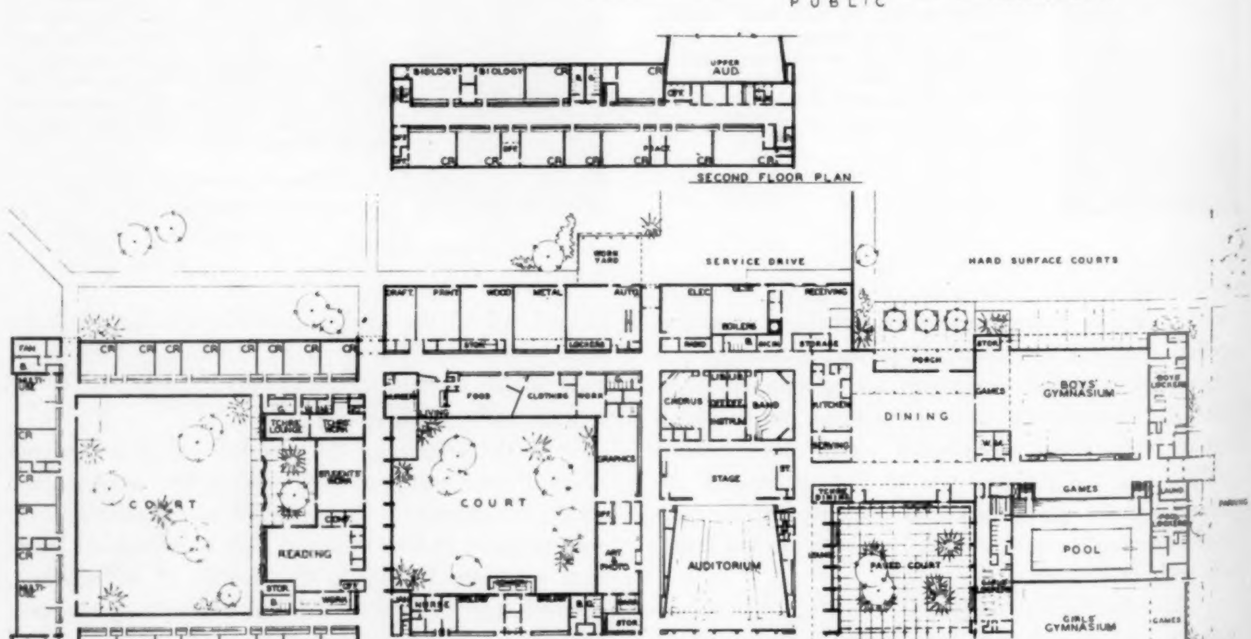
The responsibilities of the 40-member citizens committee during this period were to review the developing educational specifications and to act as liaison agents with the community. This latter function they fulfilled admirably in the distribution of a comprehensive questionnaire which helped to reaffirm the belief in integrated common learnings and specialized learnings as a basis of the school program.

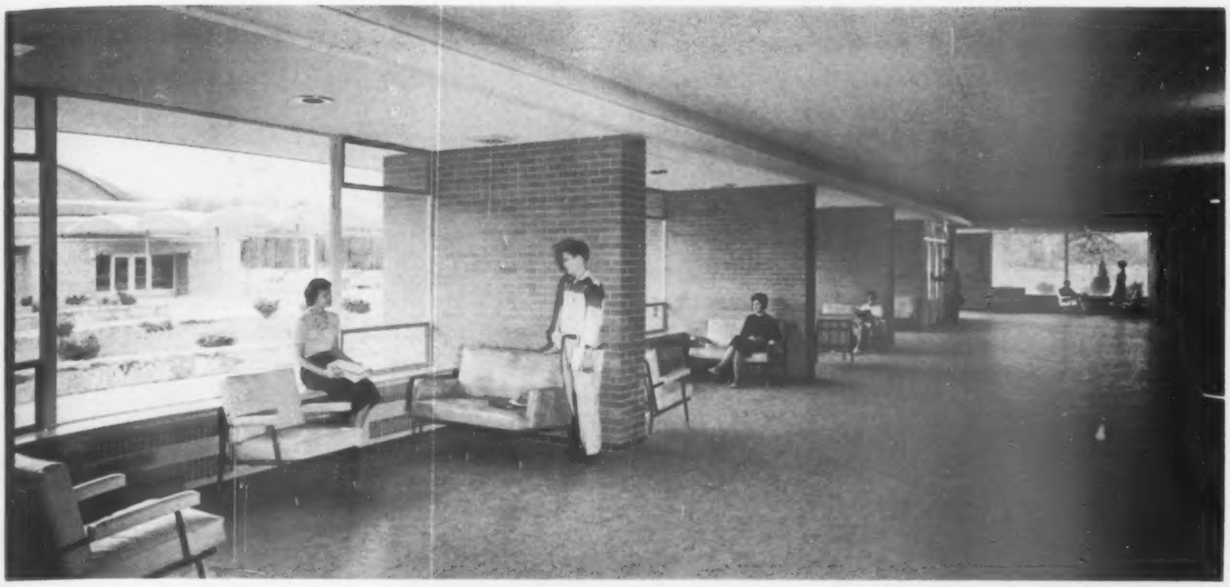
A Grant Is Received

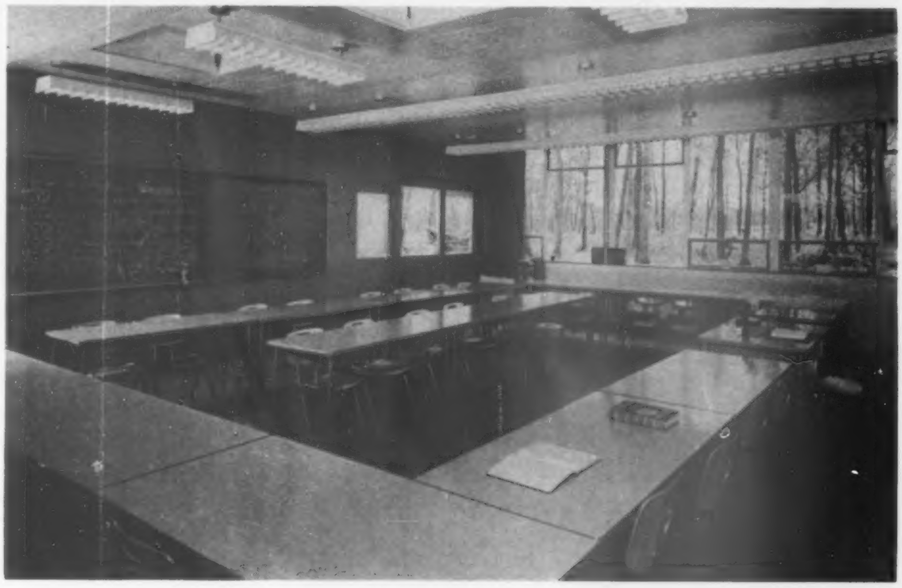
As the educational specifications were nearing completion it was Dearborn's good fortune to receive a substantial grant from the Fund for the Advancement of Education of the Ford Foundation. This grant enabled 26 teachers to spend a six-month period at the University of Chicago studying secondary education, and considerable additional time on their return in designing common and specialized learnings specifically for

Edsel Ford High School's flexibility was achieved through educational planning. Eberle M. Smith, architect, worked with committees of lay and professional people to investigate the present and future curricular needs of such a school. Research and experimentation with secondary education were carried on by 26 teachers through a grant from the Ford Foundation. The final plans for the building, as shown below, were designed in three sections. The academic, specialty and noisy areas are separated, but permit students, staff and the public to move in circular patterns easily and with no congestion.









In the academic area clustered around the library are several student lounges, such as the ones above, which provide overflow space for reading, social gatherings and small group meetings. A typical classroom in this section (right) has metal partitions to provide flexibility. Informal seating arrangements can be utilized with bilateral lighting. The glass block top lights and the windows can be darkened for audio-visual purposes. A door from the classroom leads to the teacher's office-conference room which is adjacent to a number of the classrooms.

the Edsel Ford curriculum. Such a program of research and experimentation is not an easy one, nor one that is ever completely finished, but the spirit of investigation is a prerequisite of progress.

The committees recognized that, if education is to keep pace with changes in social and scientific developments, the building must be able to house a future program that may differ significantly from present programs.

Achieving Flexibility

To achieve this principle of flexibility the building was designed in three sections, namely, (1) the so-called quiet or academic area, (2) the specialized area, and (3) the active, noisy area. Within each area additional flexibility was gained by the use of movable partitions between classrooms, allowing expansion and contraction of classroom space in terms of developing needs.

Those classrooms to house subject area instructional programs which all students would take were placed in one wing of the building, so that instructional materials would be readily accessible. It was also felt that the placing of English and social studies teachers in one area would lead to desirable interaction among these teachers in planning for a given grade level.

An Area for Science Education

In the science area the planning groups felt that, with science education in a state of expansion and rapid change, facilities should be designed on the self-contained classroom concept. Therefore, each separate science section contains both a classroom area and a laboratory area and, in general, is so equipped that

a biology, chemistry or physics class can be conducted in one room without too much reorganization of the physical facility.

Another concept of art and music education is to be found in the curriculum design itself, which has established an English humanities program. The English humanities program is concerned with the communication skills—that is reading, writing, speaking, listening, observing, but in addition it is equally concerned with literature, art and music. All students will experience some general art education and general music education, as well as the more traditional literary education.

To help achieve this, a creative arts workroom has been designed adjacent to the library, where students may gain some actual experience and understanding by working on their own projects apart from the elective art and industrial program. To implement this concept further, the library contains a number of small conference rooms equipped as listening rooms and previewing rooms which students will use in the same way.

The library is conceived as an instructional materials center from which teachers will secure not only textbooks and pamphlets, but also visual and audio materials. The listening and previewing conference rooms will expedite small group selection and use of such materials. The library is equipped with carts which enable the transfer of materials from the instructional materials center to any classroom.

Areas for Social Activity

In the desire to provide multiple use of a given space, the corridor alongside of the library and creative arts workroom has been widened and some informal alcoves added. These serve a number of purposes.

All of the necessary equipment is provided in this room for work on special projects connected with the English humanities program.

They are spill-over areas from the library for informal reading or small group activity. They will provide congregating areas for students before school, at noon and after school and for certain small group social activities.

In achieving the objective for social space, three courts were incorporated in the design of the building. The court in the classroom area is designed primarily as a place where students may congregate between classes and before and after morning and afternoon sessions, weather permitting. The second court, surrounded by the art, science and homemaking units, is conceived as an instructional court. Students in the science facilities will use some of the area for horticultural activities in connection with the natural science program. Students from the art room will use the area for outdoor sketching, etc. The area also includes a small play space for the nursery school, which is in-

Thin shell concrete roofs span the two gymnasiums and the swimming pool. These shells, developed in Europe, are the first to be constructed in Michigan and are the largest in the United States. The arching ceilings have clerestory lighting around all four sides.

corporated in the homemaking unit. The third court is the "quiet court" and is a focal point of the library and academic classrooms. It is, by intention, more cloistered than other portions of the school.

A genuine attempt has been made to create several small group areas in the physical education unit. The balcony over the main corridor is adequate to house a large number of small groups or individual activities planned for the physical education program. Adjacent to the large boys' gymnasium floor is a physical education room which will be used for similar purposes.

In the evenings this physical education room will serve as a storage center for the tables and chairs from the cafeteria. The widened corridor between the swimming pool and the boys' gym will serve as additional space for small group activities carried forward as a part of the physical education and noon-hour programs.

The automotive shop is a good illustration of the combined use of lecture and laboratory space. Beyond the overhead door is a sheltered canopy which permits mechanical work outdoors in pleasant weather.

Design of the Cafeteria

The design of the cafeteria is such that it may be used for its primary purpose—school lunches—as well as evening banquets. Further, by clearing the cafeteria of tables and chairs, a large area for evening school dances and parties is created. It is felt that the cafeteria space, designed for these three functions, will be well used by the school and by members of the community.

The planning committees also studied the uses of audio-visual materials. The decision reached was that all classrooms should be darkened to use these important instructional aids. Accordingly, educational specifications called for installation of tracks and curtains in all classrooms.

Low Cost Per Square Foot

In the attempt to achieve their many objectives, the committees were always conscious of the cost factor. It is heartening to know that the per square foot cost of the Edsel Ford Senior High School is the lowest of any of the new Dearborn buildings save one K-3 neighborhood unit.

The building has been occupied too short a time to demonstrate whether or not all the objectives of the planning groups are to be realized. Only time and experience will determine this.

What the Architect Says

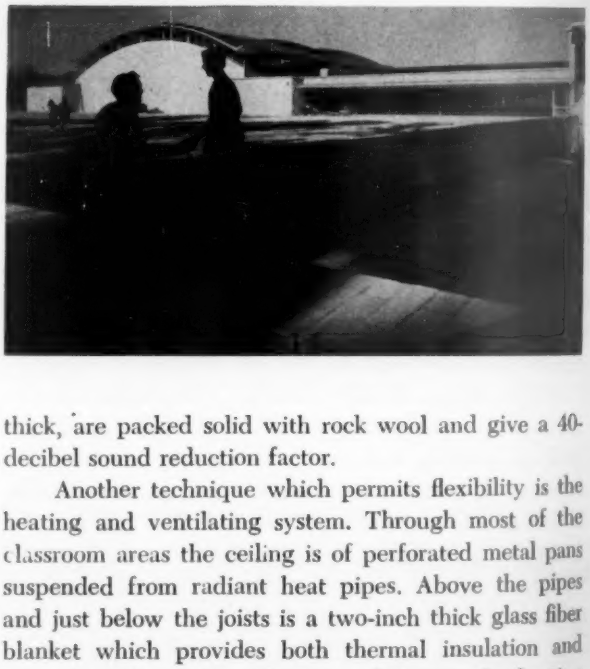
The architect speaks: let us begin our examination of the Edsel Ford High School with a quick glance at its environment. Immediately we see Dearborn, Michigan, as a city of contrasts. Less than a mile to the north of the school, set in a pastoral landscape, is Greenfield Village, Henry Ford's personal monument to the American past. Here are collected some of our nation's hallowed buildings, including the log cabin, later reconstructed as a one room school, that was the birthplace of William Holmes McGuffey of *McGuffey's Readers* fame. A few miles in another direction from the Edsel Ford High School, in a setting anything but pastoral, is the world's largest industrial complex, the Ford Motor Company's River Rouge Plant. Here is a monument to the American present, a dramatic statement of our nation's technical achievement.

This science classroom demonstrates the general trend throughout the school to combine lecture room and laboratory. Students move easily from one to the other.

This background of contrasts points up a number of things we find greatly changed in our educative processes. It reminds us how many more children we are trying to educate than we did in the nineteenth century, how much more there is for them to be familiar with, how much more we need to spend on edu-

The model living room is at the entrance of the homemaking area. The nursery school is at the right of the living room and windows of one-way glass permit observation by students of the nursery groups.

A wall surrounds the service court of the building (below). A sheltered dining terrace is immediately adjacent to the gymnasium.



cation, and how our ideas of teaching techniques have altered. We also like to think there is a marked contrast in what we know about architecture and its ability to expand and enhance the educative processes.

Henry Ford the elder, though he experienced strong nostalgia for the small McGuffey-type school of his boyhood and regretted the loss of some of its deeply personal values, was not unaware of the need for changes in educational procedure. Once he wrote, "Our life has become altogether too complex to yield the necessary training out of books. The boys have got to know a lot about everything these days in order to know any single thing well." There is something of that philosophy in this school, and the curriculum covers an astonishing range of subject matter.

Architecturally we have expanded, too. This school contains 204,920 square feet and learning extends beyond the classroom doors to encompass all areas of the building, and even beyond the building proper to embrace every part of the fifty acre site.

An Expanding Enrollment

The Edsel Ford Senior High School is designed to house, ideally, 1,200 pupils of the tenth, eleventh and twelfth grades. But population forecasts already indicate that the building may soon have to accommodate 1,800 pupils until another high school for Dearborn, on which construction will soon begin, is completed. Because of the anticipated fluctuation in enrollment and because each year brings new concepts of education, flexibility was considered of great importance to assure continuing building adaptability.

Among the features planned to promote flexibility are the movable metal partitions between classrooms. These walls, which are approximately three inches thick, are packed solid with rock wool and give a 40-decibel sound reduction factor.

Another technique which permits flexibility is the heating and ventilating system. Through most of the classroom areas the ceiling is of perforated metal pans suspended from radiant heat pipes. Above the pipes and just below the joists is a two-inch thick glass fiber blanket which provides both thermal insulation and acoustical absorption. The space between the heating pipes and the glass fiber blanket is an air supply chamber, and ventilation is through the ceiling perforations. The metal pan ceiling, which is a "snap-on" type, can be easily removed to provide access for any wiring or piping changes that develop when areas are rearranged. For this reason and because the ceiling carries through continuously in the classroom areas, the metal partitions can be readily relocated.

Portable Cabinets Are Prefinished

Flexibility was also gained by the use of prefinished portable cabinets. There are 700 standard cabinets in the school comprising twenty variations of

four basic types, all of four-foot modular dimension to permit easy interchangeability. There are, in addition, a number of specially-designed cabinets. Further freedom for possible revisions in school areas was allowed by the metal corridor lockers, which were left free-standing so that they can be relocated as needed.

It was early decided that the one story scheme had, in general, certain functional and aesthetic advantages. The spacious site permitted expansive treatment, and the bulk of the school is on one level. Among other aspects, the one story plan permits the use of the "end-on" type classroom that is deeper than it is broad and is thus economical in that it reduces overall building length.

Extensive Use of Top Lights

As it always is in school design, the lighting of the Edsel Ford High School was considered of great importance. The amount of light desirable at task level was deemed to be 30 foot-candles and, as was mentioned, top lighting was extensively used to help maintain this illumination level. The type of top light used was a low-brightness light-selecting glass block panel set in an aluminum grid. Darkening classrooms for audio-visual use is, of course, a problem and in this school the top light recesses are provided with hinged wood doors that drop down to close off the light. Also, both the exterior sash and the borrowed light frames above the corridor cabinets are equipped with drapery tracks to complete the room darkening.

As far as orientation is concerned, it will be noted that in no case do classrooms of any type face the undesirable west exposure. Generally, there is a roof overhang of three feet or more to shield classrooms from sky glare, and the many trees of this heavily-wooded site tend to diffuse direct sunlight, as do sheer curtains on the southerly exposures.

The Traffic Situation

The school, nearly 900 feet from end to end, may seem at first glance to present problems because of excessive distances for pedestrian traffic. However, an investigation of the plan and a knowledge of the school program will contradict this idea. Fifty teaching stations are toward the east side of the plan and only the five physical education teaching stations and the recreational areas are in the west portion. Because of this fact and because of the pattern of class scheduling, there will be little long distance between-class traffic.

A Series of Courts

To handle traffic in the more densely populated academic portion of the building, it was decided to wrap the building units around a series of courts, thus eliminating dead-end corridors and permitting traffic to move always in two directions. The resultant courts are not mere voids in the plan, but important design entities. In fact, the plan can be most easily studied by examining each of the three courts, its function and its relationship to adjacent areas.

Probably the most striking aspect of the total building design is provided by the thin shell concrete roofs that span the two gymnasiums and the swimming pool. This type of roof, which provides economies in the construction of large unobstructed areas, was developed in Europe and has been seldom attempted in this country. The shells at the Edsel Ford High School are, in fact, the first in Michigan and are the largest

Sliding glass doors at the left open the cafeteria to the corridor and the student forum beyond. At the right are windows and doors which open onto a sheltered dining porch. This room can be cleared of all tables and chairs when necessary for a student dance, etc.

Lens-Art Photos

The student forum is viewed from within the court which is bounded on one side by the main entrance canopy. The low windows and brick piers at the right define the student lounge area.

short barrel arch spans ever constructed in the United States.

The Gymnasium Structure

There are two shells, utilizing a double bow-string truss between them, over the boys' gymnasium. This room, measuring 130 feet by 110 feet, serves also as an exhibition gymnasium and provides seating for 1,350 persons on permanent folding bleachers. The concrete shell roofs, which vary in thickness from five inches at the crown to ten inches at the upturned edge, were each poured in a single day and allowed to cure about two weeks before the formwork was removed. Both gymnasiums have an acoustic tile ceiling applied directly to the shell, and the swimming pool has a special moisture-proof type of acoustic ceiling with glass fiber behind perforated panels. Especially dramatic are the arching ceilings of the gymnasiums, for each of these rooms has clerestory lighting on all four sides, which gives the thin shell roofs a sense of "floating" in air.

Aside from the thin shell concrete roofs of the physical education wing, the structural systems employed throughout the project are more conventional. Nearly all of the one story portions are framed with steel bar joists. The two story portion is of reinforced concrete and interesting in that the exterior columns and the joists were precast before reaching the job site. Two special areas of the school, the library-work center and the cafeteria are framed in wood with wood ceilings to give them a warm, informal appearance.

Everyone who visits the Edsel Ford High School is impressed with its splendid site. Approximately fifty acres in total size, the thirty acres in the center were cleared, while the balance was heavily wooded. Nearly every sort of game is provided for with, perhaps, a more-than-usual emphasis on sports that can be enjoyed not only by students but by townspeople, for the City of Dearborn has distinguished itself in making its recreational facilities available on a community-wide basis.

A separate building provides playground restrooms, pumps for the underground sprinkling system and storage for bleachers and sports equipment. Permanent football field bleachers will seat 1,500 and temporary stands will seat 1,000 more. Parking is provided on the site for 450 cars and 600 bicycles. The site, still under development, is to include an extensive driver-training area, which is related to the student automotive shop and a projected garage. This emphasis on automobiles is a reflection of the Dearborn community environment as a suburb of Detroit, the "Motor City."

We Witness a Transition

We have witnessed, in the last half-century, a great transition in our ideas of what a school should be. The distance between the one classroom school at Greenfield Village and the Edsel Ford High School cannot be measured merely by a geographic mile nor a certain span of years. It seems unlikely that Henry Ford, as he studied the *McGuffey Reader* in a one room schoolhouse, would have envisioned a 450-car parking lot as a necessary adjunct to an ideal school, though he had much to do with creating that necessity.

Yes, times have changed, and our ideas have altered. But perhaps our objectives are, today, not so greatly different. Every thought and plan that has gone into this building has been based on a determination that it should stand in the future as an inspiration for young Americans to go forward. This is a continuing objective, and a vital one.

The Rogers High School, Kelly & Gruzen, architects, will contain ten separate buildings connected by covered walks. Circular element houses the fine arts center and a 1,400-seat auditorium with a theatre-in-the round.

PLANNING NEWPORT'S NEW ROGERS HIGH SCHOOL

by CARL H. PORTER-SHIRLEY,

Superintendent of Schools, Newport, R. I.

Mr. Porter-Shirley has a B.S. degree from Bridgewater, Massachusetts, State Teachers College, and an M.Ed. from Rhode Island College of Education. He has been a principal and school superintendent in Connecticut, Massachusetts and Rhode Island.

N. L. ENGELHARDT, SR.,

Engelhardt, Engelhardt and Leggett, Educational Consultants, New York City

Dr. Engelhardt has been engaged in school building planning activities since 1916. He was also a professor of educational administration at Columbia University for 27 years. His firm has participated in planning schools in over 300 communities.

and B. SUMNER GRUZEN,

AIA, Kelly & Gruzen, Architects-Engineers, Newark, New York, Boston

Prior to private practice Mr. Gruzen was associated with architectural firms in Boston and New York. He holds B.Arch. and M.Arch. degrees from Massachusetts Institute of Technology and did graduate work at the Ecole des Beaux Arts in Paris, France.

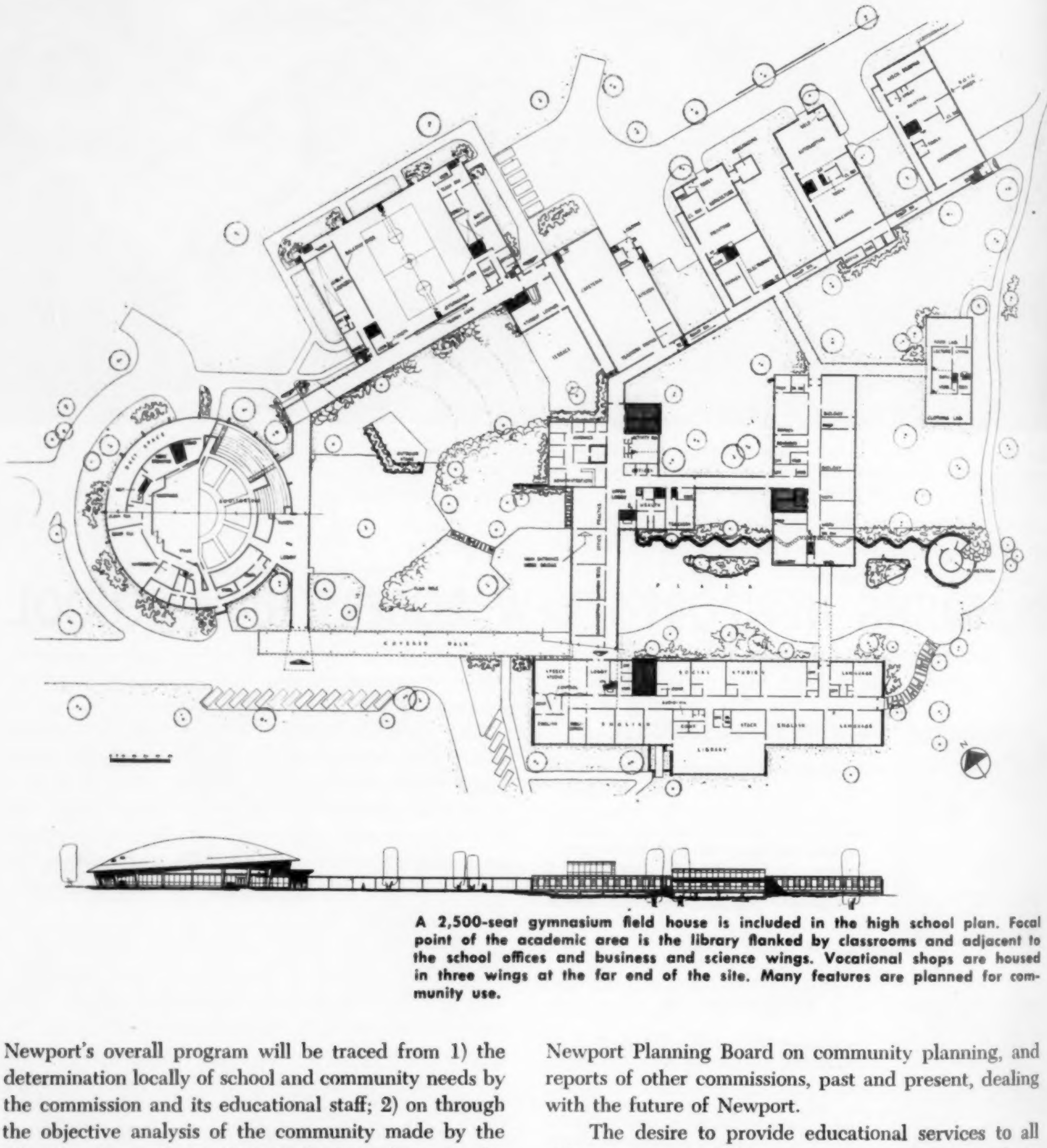
ON "Battery O'Shea," the site of a wartime gun position overlooking the Atlantic Ocean, Newport, Rhode Island, broke ground in April, 1955, for its new 1,000-pupil Rogers High School. Designed along the lines of a university campus, with great emphasis placed upon maximum community use of the new facilities, the plant is slated to be one of the first of its kind and scope in New England.

Although the ground breaking ceremony merely signalled the start of construction the occasion, nevertheless, marked the partial culmination of a long, intensive and well coordinated study of Newport's school-community problem.

This study represented the combined efforts of Newport's five-man high school commission, headed by Dr. Samuel Adelson, a physician; the superintendent of schools, Carl H. Porter-Shirley, and his faculty; the firm of Engelhardt, Engelhardt and Leggett, Educational Consultants; and the architects, Kelly & Gruzen. The technical consultants were: C. W. Riva Co., structural engineers; Hayden Harding & Buchanan, mechanical engineers; Chambers & Moriece, site engineers; Bolt Bernanek and Newman, Inc., acoustical consultants; and Dimeo Construction Co., general contractors.

As reflected in the final plans, the contributions of each group attest to the diversified skills and experience backgrounds which have become part and parcel of today's school planning process.

In the following paragraphs, the development of



A 2,500-seat gymnasium field house is included in the high school plan. Focal point of the academic area is the library flanked by classrooms and adjacent to the school offices and business and science wings. Vocational shops are housed in three wings at the far end of the site. Many features are planned for community use.

Newport's overall program will be traced from 1) the determination locally of school and community needs by the commission and its educational staff; 2) on through the objective analysis of the community made by the educational consultants; 3) to the final translation by the architects of the community's needs into a group of buildings.

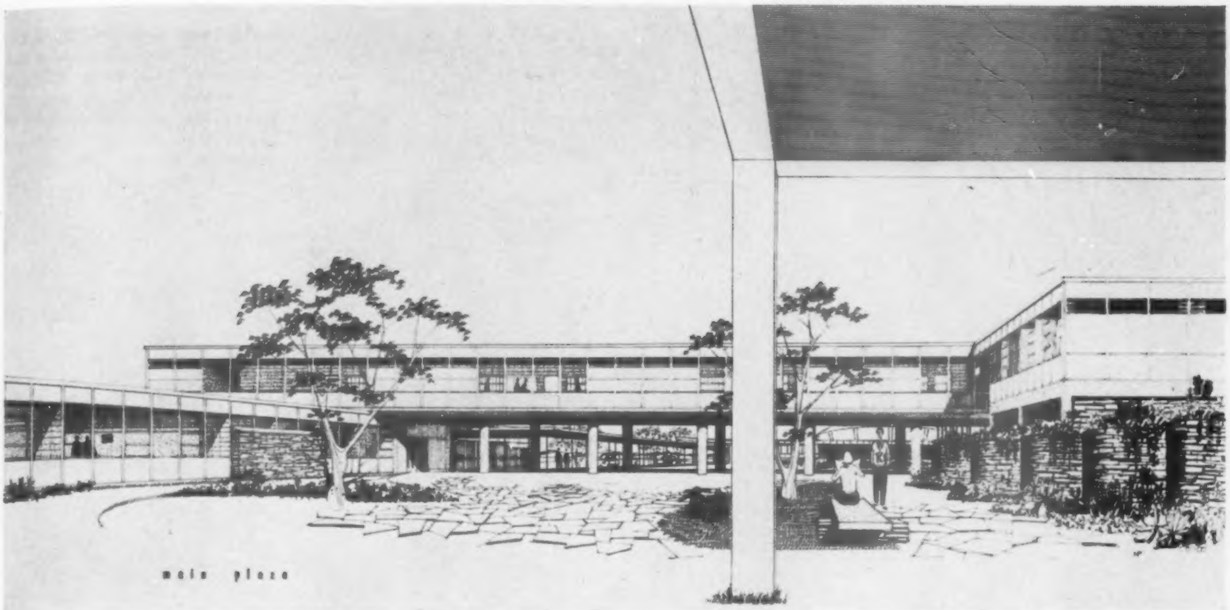
The Planning Processes Locally:

It took over five years to plan the new Rogers High School in Newport, Rhode Island. It was time well spent. In the beginning the school committee, by considering factors such as birthrates, school enrollments, population statistics, new residences, possible economic impacts and impacts of the armed services, developed a long-range school building program.

Further considerations were given to reports of the Newport Planning Board on community planning, and reports of other commissions, past and present, dealing with the future of Newport.

The desire to provide educational services to all citizens, young and old, was given an important role in the planning of the long-range program. Moreover, such a program had to be flexible and adaptable to different forms of future school system organizations which may or may not include a junior college. All studies, surveys and conclusions resulted in provisions for possible increases and even decreases in school population for the next twenty-five or more years.

As part of the long-range program, a new high school, housing 1,000 pupils in grades 10, 11 and 12, was determined necessary. It was also realized that the new high school might have to be enlarged in the future to house 2,000 or more pupils; it might become a four-



The main plaza of the high school is flanked by academic wings of the plan and by the administration section, seen at the right beyond the wall. The use of columns eliminates costly excavation.

year high school, or even a four-year school plus the 13th and 14th grades, since the future population of Newport is so unpredictable because of the impact of the Armed Forces. By 1949, it was determined that a new Rogers High School would be an essential part of the long-range educational program.

Selecting the School Site

The planning of the school building and the selection of the school site took place concurrently. The site, as in most communities, proved to be a most difficult problem. The planning pattern was as follows:

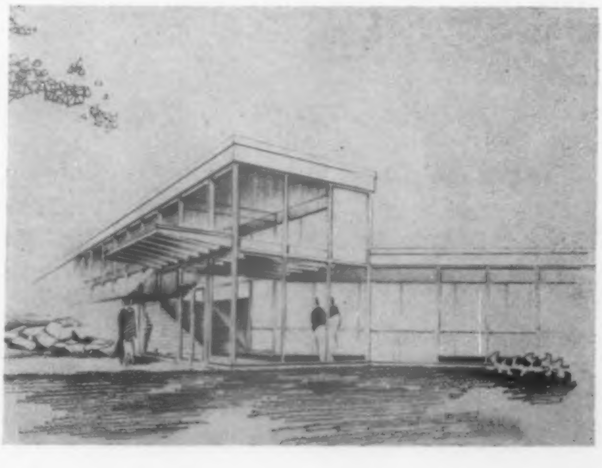
1. The school staff, using such criteria as size, shape, accessibility, parking, undersoil and footing, landscaping possibilities, environment, plot layout possibilities, contour, probable costs, family residences to be razed, public appeal and nearness to related units, designated all possible areas in the city for the location of a school which would be readily accessible to students.
2. The above studies were submitted to three nationally known school building consultants who, as a committee, determined the most desirable sites in order of preference.
3. Since the factor of accessibility to students was later minimized and future growth of the city was to be given greater emphasis, new areas for school site purposes were studied.
4. Studies and reports were reviewed by the educational consultants appointed to the new high school and recommendations were again reviewed by the school committee.

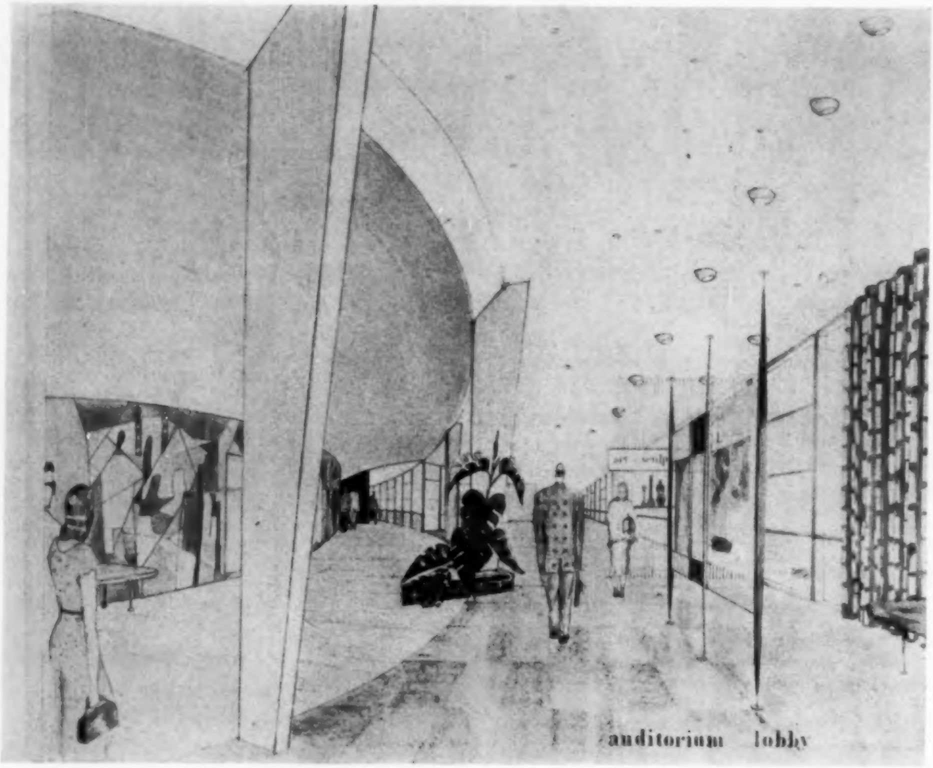
The site was selected after approximately three years of study. It consists of forty acres located in the geographical center of the city and yet readily accessible to a large proportion of the established population. Providing for the future growth of the city of Newport proved to be a major factor in the selective process.

A Complete Site Survey

However, before final acquisition, an architectural firm was appointed to make a complete site survey. Borings were made, possible locations of playfields and other site functions were determined, and possible location of school buildings was suggested. These studies enabled the school committee to know the approximate costs of site development along with the costs of acquisition.

The northwest entrance leads to covered walks which connect all buildings. Access is thus gained to each of the different site levels.





The fine arts center and auditorium unit is covered by a circular, thin shell concrete dome spanning 160 feet, with a cantilevered bowl, at left, covering the seating area. The center also has an art room, rehearsal rooms and private practice areas.

The planning process for the new Rogers High School consumed five years of time. Approximately 70 teachers and the administrative staff investigated "what was to be taught" and "how it was to be taught." Policies were simultaneously made by the school committee.

Primarily, the new high school was to meet the educational needs of all Newport youth of high school age regardless of talents, race, creed or color. Maximum educational opportunities for each student were to be realized in accordance with his own capacities as he prepared himself for citizenship, work and family life.

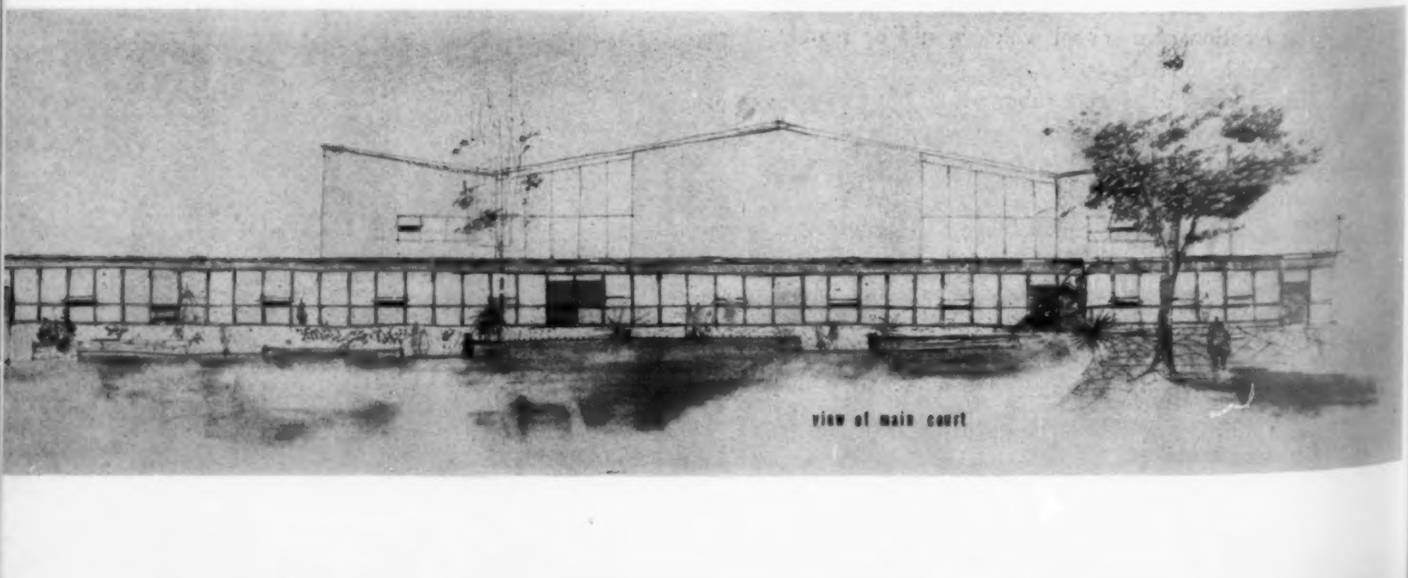
Secondly, the school would provide, as much as possible, for the civic, educational and recreational needs of the adult citizens of Newport.

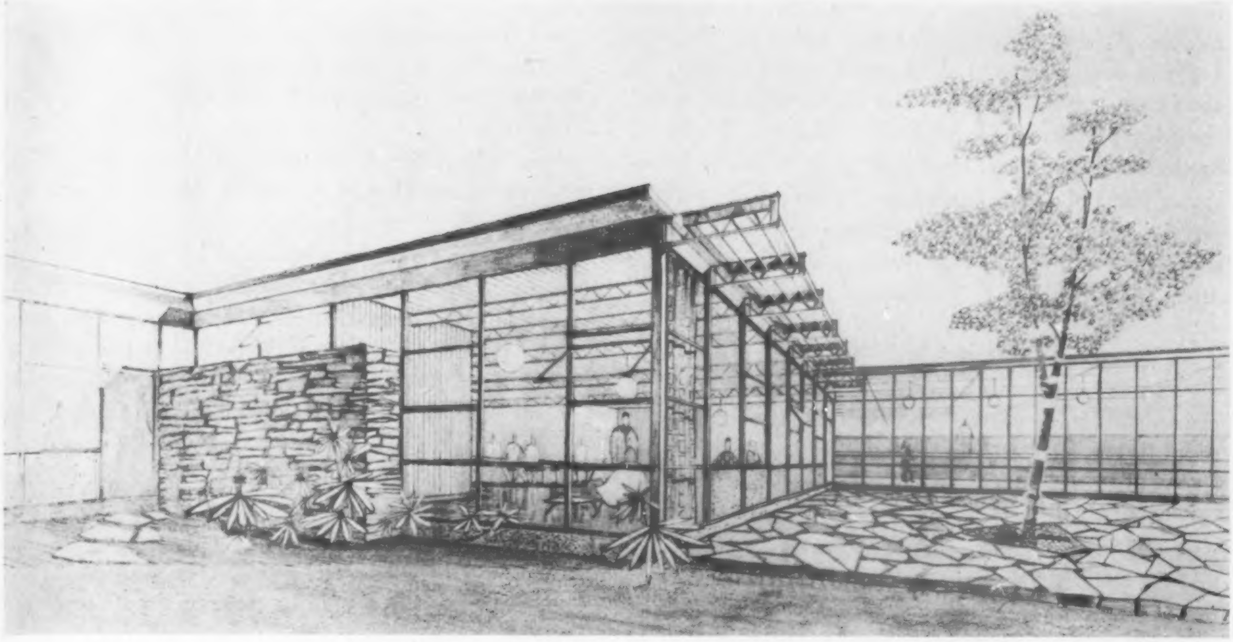
Thirdly, the building, itself, must be so flexible that needed additions could be made without destroying or impairing the efficiency of the building as an educational institution. These became the basic policies as determined by the school committee and were the concept for planning the facilities and preparing the educational specifications.

First Educational Specifications

All high school personnel and the administrative

The main court is bounded by all glass corridor walls, with the gymnasium in the background. The cafeteria terrace is at right.





The student lounge will serve as the school social center, with a snack bar and room for one hundred students. The lounge is also near the gymnasium, auditorium and concert court which are designed for community use.

staff, approximately 70 in number, considered various factors in determining the facilities needed in the new Rogers High School in accordance with the established policies of the school committee. These factors and accompanying studies were as follows:

1. *Pupil membership.* The number of students taking the various subject offerings in 1950 and during the previous five-year period.
2. *Teaching load.* The number of students per teacher according to the subject offerings and the establishment of desirable pupil-teacher ratios for each subject offering.
3. *Subject offerings.* The number of subjects offered in 1950 and the establishment of additional subject offerings in order to meet the school committee policies.
4. *Teaching methods.* The kinds of teaching methods allied with each subject offering which meant new types of facilities and additional space.
5. *Co-curricular activities.* The extent of a desirable co-curricular program and how this program required additional facilities and space.
6. *Non-classroom features.* The determination of facilities such as guidance, students' union and lounge, offices, cafeteria, auditorium and allied areas, gymnasium, clinic rooms, teacher rooms, health centers and library.
7. *Classroom relationships.* The establishment of relationships between and among classrooms and other areas of the proposed high school building.
8. *School site.* The determination of necessary functions of the school site as it related to the total school program.

Final Educational Specifications

The above studies were not conclusive. Many recommendations submitted by the staff were either too elaborate or too meager. Some ideas had to be clarified by the school architects. Others had to be analyzed because of cost factors.

Meanwhile, the educational consultants were also preparing educational specifications in accordance with directions by the high school commission, the authority designated to construct the school building. The story of the efforts and close cooperation of the educational consultants in completing the final educational specifications follows.

The Educational Consultant's Analysis:

Cities of the 30,000 to 40,000 population class are finding it necessary to extend their high school facilities during this decade 1950–1960. The old central high school in these cities no longer suffices in many cases. That is what happened in Newport, Rhode Island.

The population of Newport is approximately 33,000 to 35,000 and has been fairly stable over a period of years. Its chief economic support comes from the location of Federal agencies in its midst and its long history as a center for an extensive summer colony and for recreational activities in general.

Within Newport is found the largest collection of large summer estates existing in this country, bathing

beaches and other extensive opportunities for recreation associated with its extensive water facilities. The city has two major residential divisions, one consisting of the large estates with a low density of population and the other a rather compactly built and irregularly shaped section of homes, both large and small. The city boundaries can only be extended to the northeast, but the possibilities of such extension are remote because of the development of Middletown, with an entity of particular distinction.

Expansion Is Expected

The population of Newport may be expected to expand in future years if the Federal Armed Services continue the use of their strategically located facilities and if the large estates gradually yield to infiltration of smaller home units for summer as well as all-year occupancy. The city covers some of the most attractive and alluring residential area in the country and will continue to draw citizens from more congested residential areas. This will be particularly true as access to Newport from the north is made less costly. This will have its effect on all school population, including that of the high school.

The new Rogers High School is the end-product of a long-felt need and a series of citizen programs to secure the kind of high school that might be expected to serve the community for decades to come. The school committee (namely, the Board of Education), assisted by the high school building commission, carried the ball for the people in advancing the cause of the project.

A Commission Is Created

In January, 1950, the General Assembly of the State of Rhode Island passed an act creating a commission to erect a new high school in Newport, providing for the condemnation of land for the location of the school, and authorizing the city of Newport to issue bonds in the sum of four hundred thousand dollars to pay for this land and for plans and specifications. Among other responsibilities, the commission was authorized to acquire the site as soon as possible after its designation by the school committee, in accordance with the provisions of Section 3, Chapter 178 of the General Laws of Rhode Island, 1938. The commission was given all the powers conferred upon towns for the condemnation of land for school purposes.

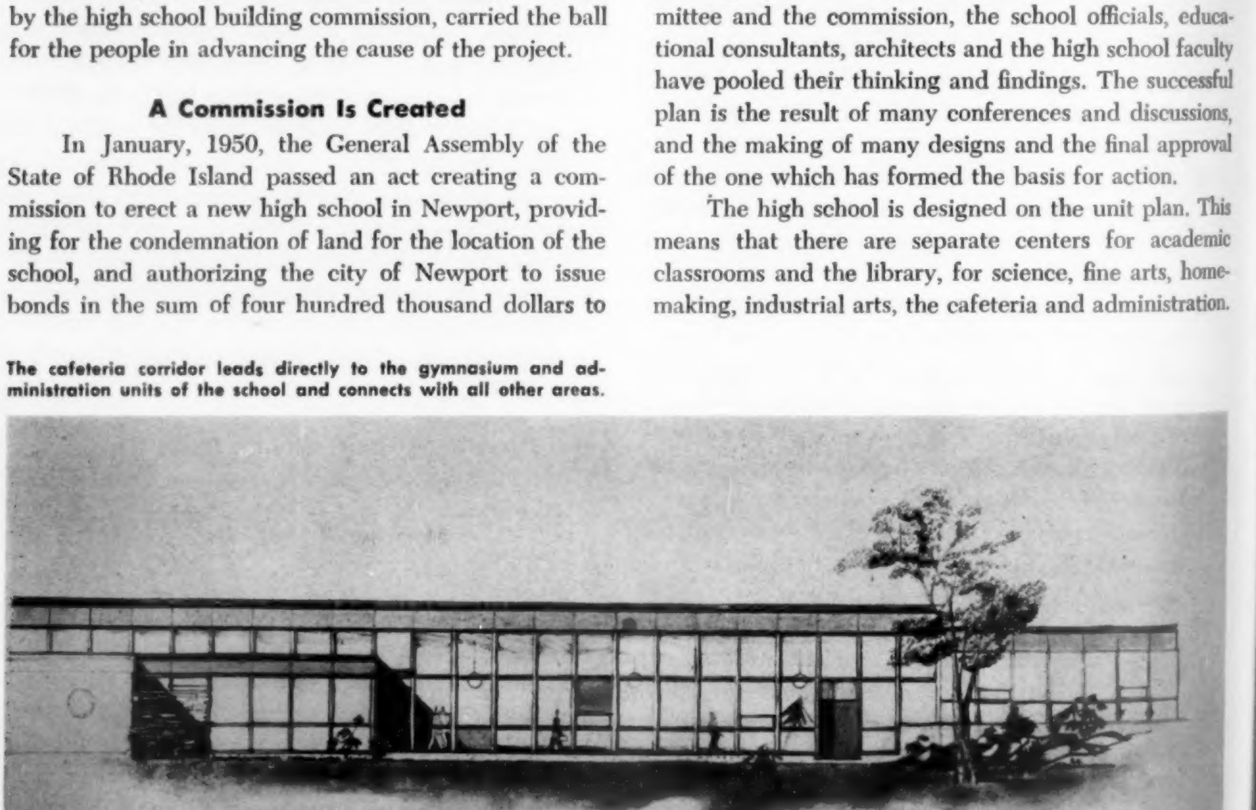
Adequate sites for a high school do not exist in abundance in Newport. After several studies of school sites and public consideration of adequate as well as inadequate ones, the decision was reached to acquire a site which was not too remote from the city's geographic center. This site, topped and underlain by much rock, was used as a defense base by the Armed Forces during World War II. Evidence of such use existed in gun emplacement bases, excavated areas and otherwise irregular contours. On this substantial foundation the new Rogers High School is being built. Rock removal was expensive but should be contrasted with an original low cost of site.

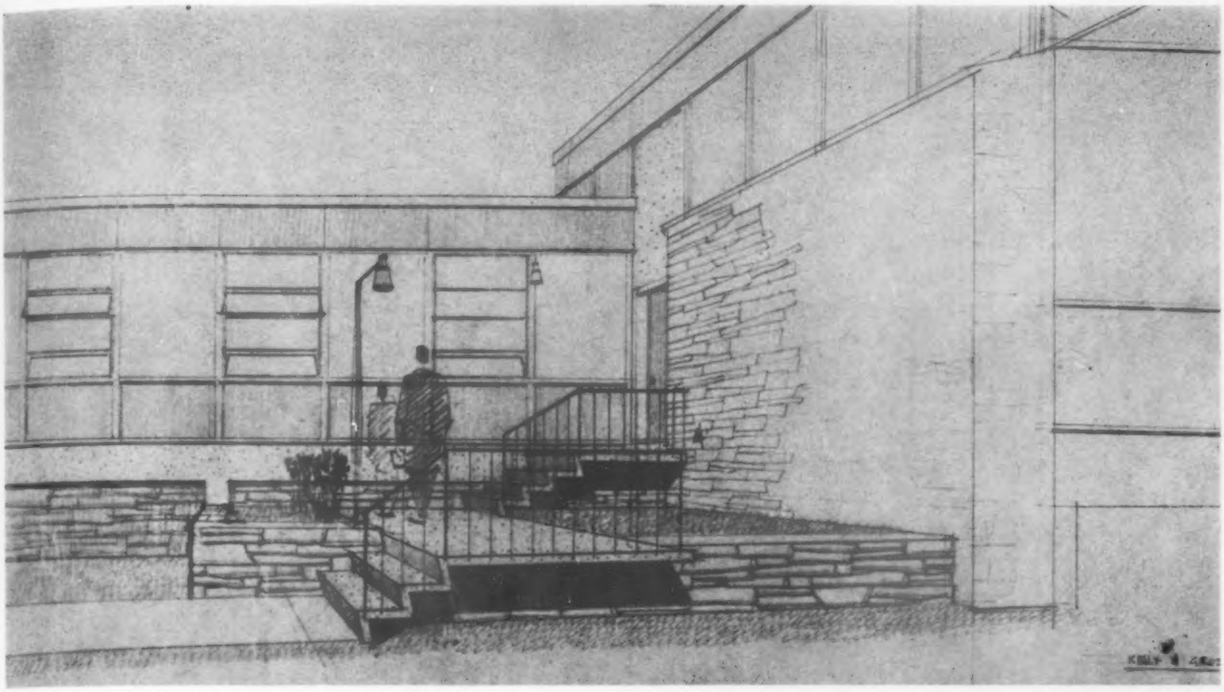
A new high school has emerged of which Newport may be exceedingly proud. It provides an ideal arrangement for secondary school work in accordance with the demands of sound educational thinking, community use and economy of construction.

The planning of the high school has been a long, thorough process. Over the past five years the committee and the commission, the school officials, educational consultants, architects and the high school faculty have pooled their thinking and findings. The successful plan is the result of many conferences and discussions, and the making of many designs and the final approval of the one which has formed the basis for action.

The high school is designed on the unit plan. This means that there are separate centers for academic classrooms and the library, for science, fine arts, homemaking, industrial arts, the cafeteria and administration.

The cafeteria corridor leads directly to the gymnasium and administration units of the school and connects with all other areas.





It is planned that a public entrance will be available to the library, apart from all other areas of the school, permitting community and after school use of the area.

Under the unity of the overall scheme, the plan means the future possible extension of all departments, the placement of units without interference with one another and conservation of light and air.

Unit Plan Advantages

The unit plan has the added advantage of great flexibility. As has been pointed out, Newport is a growing community. Should there be a need to increase the high school facilities in the future, it can be done easily and economically without destroying the unity of the whole.

Primarily, the Rogers High School is designed to meet the educational needs of Newport's secondary school students but it is also designed so that part of its facilities can be shared with the community. Particularly is this true of the auditorium (in the round) and ancillary music and art spaces. It is expected that the auditorium will serve the community all the year round, especially for summer musical events.

Architectural Translation:

The initial program, as given to the architects by the commission, called for a comprehensive high school for 1,000 pupils. It was required that the plan incorporate facilities for academic, commercial and vocational curriculums at one site, within a scheme which would be easily expandable for future needs. Also, great emphasis was to be placed upon making the new facilities available to the community, particularly through providing ample auditorium and gymnasium areas to accommodate numerous community activities in addition to the basic needs of the school program.

Prior to the selection of the architects, members of the commission had inspected a number of recently completed secondary school buildings. They came away with an opinion that they would prefer a campus plan rather than a single unit building all under one roof provided, of course, the site they had chosen would lend itself to such development and if, in the view of the architects and educational consultants, no undue premium would be paid for such a plan.

Since the commission had certain budgetary limits in mind, several conferences were held between the architects and consultants in order to set basic requirements in terms of square foot areas for the entire plant. The architects indicated that the use of separate buildings would achieve the greatest amount of flexibility possible in various school departments for handling immediate as well as future needs. With each department housed in a separate building the possibilities of future expansion could be unlimited.

It was also pointed out that different educational departments would require different forms of architectural treatment. In the conventional school, the needs of each department are often squeezed into the rigid pattern of the overall building. In the campus plan, it is possible to individualize to a greater degree the character and function of each department. Also, as an economy and space saving measure, the use of exterior passages between buildings can be less expensive than interior corridors.

The walls at the main court entrance are of glass, with upper and lower opaque spandrels of porcelain enamel being placed on an insulating core.

A thorough study of the 40 acre site was made by the architects. They found the site to be really magnificent as far as location, size, view and freedom from encroachment were concerned. On the other hand, much of the terrain was exceedingly rugged, with a great deal of rock in evidence, and a difference of some 30 feet vertically between the high point and the general low point of the area. There were several abandoned rock quarries and some low, marshy spots. Since a substantial portion of the area had been developed as an anti-aircraft installation, there were also numerous emplacements, bunkers, pits and the like at various points.

Area for Recreation

One of the requirements of the development program was the allocation of approximately ten acres for recreational purposes. Into this area there was to be not only the football field, but a full size high school track, hockey field, tennis courts and sizable parking areas. All of this would require sufficient ground to pre-empt most of the flat or substantially flat areas existing on the site. This, of course, left the more rugged portions of the site for the development of buildings.

After a careful analysis of the site's topography by the architects and a series of exploratory conferences on the possible means for developing the site, it became apparent that there were only two possible solutions to the building problem. The first would be a multi-story school on as small an area of ground as possible. The second alternative would spread the school out in such a manner that the various levels of land could be readily adapted to form an attractive whole, with the various levels serving as enhancements rather than remaining as detriments to good planning.

The first proposal was unacceptable not only to the architects but to the commission as well. Thus, the site was studied in greater detail with the second proposal in mind. Members of the architectural firm not only visited the site again, but remained there for several days, actually setting up a small design staff "on location." An analysis of the site was prepared indicating the potential location of building elements from every possible approach. Many photographs were taken and well over a dozen possible schemes were developed at this time.

Later on, a topographical model of the site (at a scale of one inch for every 40 feet) was prepared and further studies of possible building arrangements were made through the use of clay models. During this process preliminary plans were prepared and discussed with the educational consultants, the superintendent and members of the commission. Finally, the various al-

ments of the school fell into place and an overall scheme, both in model and plans, was presented to the commission by the architects.

The Scheme Has Two Levels

The scheme presented was substantially in two levels, separated except for a very small connecting section. At an upper level were the administrative and commercial wings, mathematics, science, home economics, cafeteria, shops and gymnasium. At a lower level, and connected by corridors and stairs, was the academic wing containing not only English classrooms but also language and social studies, the library and speech lab. Here the library was placed to become the focal point of the academic area. The auditorium, containing the art and music departments, was at approximately the same lower level, but separated from the academic wing on the one side by a covered passage and connected to the gymnasium on the other side by an enclosed corridor containing a stair transition.

The whole, with auditorium to the west; gymnasium to the north; cafeteria, administrative and commercial to the east—forms a large and handsome court on "campus" which can be seen from a main approach road through the covered but open connection between the academic wing and auditorium.

A Series of Conferences

Once the general scheme was solidified, there began a series of conferences with the superintendent, the high school principal and various department heads, in which the details and arrangement of each classroom, laboratory, shop and each departmental office were worked out. In some cases it was determined that the original program space allocation was not sufficient and areas had to be added for work areas, storage spaces, group work or conference rooms and the like. These increases also included some enlargements to the auditorium and gymnasium in order to accommodate additional seating not directly related to the high school program, but aimed at meeting the needs of community activities. After several weeks of intensive meetings and

Hopf

Major elements of the Rogers High School, Newport, Rhode Island, are now under construction. Structural members of the circular element are just being put in place.

planning conferences, these problems were resolved and all area adjustments were made.

The Method of Construction

At the completion of preliminary plans, no final decision had been made regarding the exact method of construction to be employed. However, as the form of the school developed, with the commercial wing forming a bridge over the main entrance, with commercial classrooms superimposed over a part of the academic wing, and with the thirty-foot standard classroom depth, these features seemed to indicate the need for light, flexible (in a planning sense) construction. Therefore, a system was chosen, for the major portion of the work, which employs square, tubular steel columns on twenty-foot centers along the perimeter, and giving thirty-foot spans from outside wall to corridors.

Exterior walls are of glass, with upper and lower opaque spandrels of porcelain enamel on an insulating core. The roof is supported on long span, open-web joists with fireproof insulating deck and a flat bonded roof. Classrooms will have acoustically treated ceilings. Exposed corridor walls below door height are to be finished in an impervious precolored masonry material. Most interior surfaces will remain unplastered and color will be used extensively to enliven the building.

Highlighting the community use aspects of the plan is the circular auditorium and fine arts building designed as a "theatre-in-the-round." Covered by a thin shell concrete dome spanning 160 feet, the auditorium will have the unusually large seating capacity of 1,400 to accommodate the summer concert and theatre programs with which Newport has been identified for many years. Similarly, the gymnasium building, with its maximum seating capacity of over 3,000, was planned for extensive use by the community, as well as for the school's athletic program in which the basketball teams, particularly, have received wide acclaim.

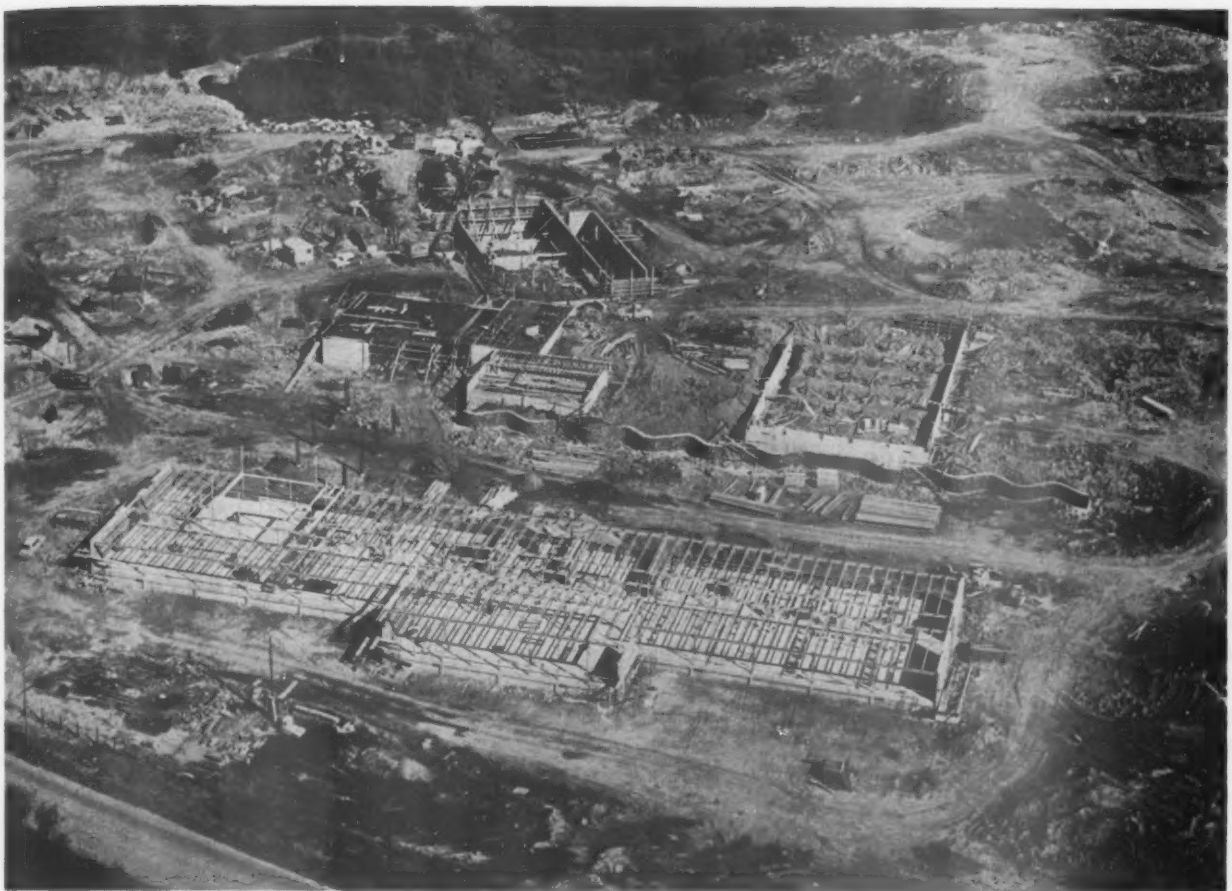
The total square foot area for the school is 160,000 square feet, with the volume running to 2,490,000 cubic feet. Construction contracts awarded totalled $2,562,639 which included landscaping, terraced areas, retaining walls and parking areas in the immediate environs of the building.

The School Itself

One academic building consists of seven English classrooms, four language classrooms, four history (social studies) classrooms, three departmental offices, one student-publications room, one sound studio and the library.

All equipment and facilities are the most modern available for promoting the educational processes. Audio-visual equipment is provided and listening booths in the language department enable students to hear their own enunciation and pronunciation; record players will be available; the sound studio room is connected directly with the local radio station; facilities to produce school publications will be located in the student publication room; movable furniture is used; and display areas,

Key units of the school are the auditorium, fine arts center, gymnasium, student union, cafeteria, shops, home economics, administration, math-science, academic and library.



Hopf

The major portion of the work employs square, tubular steel columns on 20-foot centers at the perimeter, with 30-foot spans reaching from walls to the corridors.

book shelving, filing equipment and storage spaces are ample to fit exacting needs.

The library will accommodate 114 pupils at a time. It has a 12,000-volume book capacity. In addition, there are two conference rooms also used for group study, an AV room with two listening booths, microfilm viewing facilities, a workroom and a librarian's office. There is a separate entrance to the library for public use.

The science and mathematics building consists of four science laboratory classrooms, three mathematics classrooms, photography dark room, science research room and departmental offices. Adjacent to the building is the science courtyard and planetarium.

This building will contain the latest equipment to provide opportunities for instruction, investigation and experimentation. Provisions have been made for use of audio aids, charts, maps, models, specimens' microprojection apparatus, films and filmstrips. The planetarium, as well as the building, will be made available to the public after school hours. Of course, use by the students of the facilities after school for special projects will be promoted.

The fine arts building. The great circular auditorium, a theatre-in-the-round with a seating capacity of 1,400, along with dressing rooms, make-up rooms, waiting rooms, costume storage space, a public foyer with ticket booths, display areas, public telephones and toilet facilities, is to be found in the fine arts building. The auditorium will be invaluable for public use. The stage, one of the largest in Rhode Island, can be used for music festivals, symphony orchestras and drama on either an amateur or professional basis. An outstanding feature of the auditorium is that no member of the audience will be more than 65 feet from the stage.

The fine arts building also contains four practice rooms for music instruction, offices, band rehearsal room, a choral room, an art room and a large area for the stage. The building is designed so that large choral and instrumental groups can be rehearsing simultaneously while smaller groups are practicing. The art room contains the usual facilities, clay equipment, a ceramic kiln, potter's wheels and damp closets.

An unusual feature of the high school is the large outdoor natural stage and music shell. The lay of the land is such that 3,000 people can be seated on the grass lawn or terraces in this natural amphitheatre which can be used for graduation exercises and other functions involving large audiences. In planning the new high school ample provisions have been made for public parking.

Facilities for 400 cars are available directly behind the fine arts building. There is an additional parking space on the grounds that will take care of 200 cars.

The administration and business education building is located in the center of the new high school area, at a higher elevation than most of the other buildings. The main entrance to the school and a large foyer are located in the administration center. All administrative offices are located here, and nearby is a very modern and complete health center. There are also six classrooms in this building where business education studies are carried on. Classrooms contain various business machines, typewriters and facilities used in actual business practice.

Physical Education Building

All space in the *physical education building* has been used to maximum advantage. Half of the physical education facilities are allotted to boys and the other to girls. The gymnasium becomes two gymnasiums, each 55 by 100 feet, when divided by motor-driven door partitions. For spectator sports over 2,300 spectators can be seated on folding-type bleachers. When larger crowds must be accommodated for indoor graduations and such, over 3,000 people can be seated by using the gymnasium floor as seating area. The building contains ample dressing rooms, shower facilities for students, as well as facilities for the public, generous rooms for indoor sports and large storage areas. For the boys there are an outdoor track, the football and soccer field and a baseball diamond. Field hockey, archery, soccer, baseball and basketball can be played by the girls. There are four outdoor tennis courts.

The physical education and outdoor athletic sports facilities are designed for community use, with ticket booths, public toilet facilities and refreshment facilities provided for the public.

The dining and study hall building serves a dual purpose. The dining area can accommodate 360 at one time, and the dining hall may be divided into three sections by movable partitions to accommodate 120 in each. These areas are also used as study halls. The food preparation area, containing all necessary kitchen equipment, can be separated from the dining area by closing doors on an overhead partition.

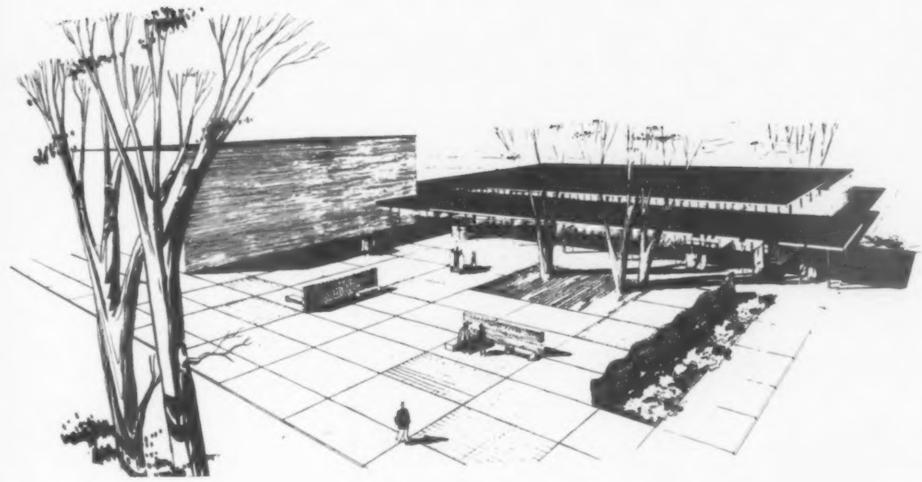
This building also contains smaller dining rooms for teachers, and a students' lounge. It is located adjacent to the gymnasium and auditorium making all three facilities a complete unit while each is used separately. In the basement of this building are the boiler room, laundry and custodial quarters.

Other Areas

Also located on the campus of the new Rogers High School is a *homemaking arts building* and three *industrial arts buildings*. All of these buildings are equipped to stimulate and instruct the students in whatever field they choose. Food and clothing laboratories, a living center, laundry equipment and many other facilities are to be found in the homemaking building. These facilities can be used by adults. Vocational opportunities in electronics, printing, agriculture, machines, automobile mechanics, woodworking, painting and mechanical drawing are available in the vocational education buildings. There are facilities to be explored before a student definitely decides which shop he would like to concentrate on. The R.O.T.C. facilities are on the first floor of one of the vocational buildings.

Service to Youth and Community

It is estimated that the new school will be completed by December, 1956. The Rogers High School will be an outstanding addition to Newport and will well serve the community and its present and future students. The country may well look to the Rogers High School as one of its finest high schools.



To conserve as much outdoor space as possible an L-shaped design was arranged for the Guymon, Oklahoma, Senior High School. Architects are Caudill, Rowlett, Scott and Associates of Bryan, Texas, and Oklahoma City, Oklahoma.

GUYMON HIGH SCHOOL—SOLUTION TO A SMALL SITE

by GEORGE W. SPENNER

Superintendent of Schools, Guymon, Oklahoma

Mr. Spenner is now beginning his twelfth year as superintendent of the Guymon, Oklahoma, Schools. A native of the state, he began his teaching experience in a one room school in Major County. Mr. Spenner's thirty years of professional service to the schools of Oklahoma include positions of rural teacher, classroom teacher, high school principal, county superintendent and city superintendent.

THE Guymon, Oklahoma, Public Schools have grown from an enrollment of 716 during the 1943–44 school year to 1,400 in 1954–55. During the same period of time the number of teachers has increased from 22 to 65.

Over one million dollars of school construction has taken place in these same years. The new Guymon Senior High School was erected, as well as a junior high school, shop and agriculture building, a new elementary school, a gymnasium, an elementary addition, six extra classrooms, a band house and a garage.

Three basic considerations entered into the planning and design of the Guymon High School—educational factors, environment and economy. The building, designed by Caudill, Rowlett, Scott and Associates, architects of Bryan, Texas, and Oklahoma City, Oklahoma, was planned for maximum educational function. It provides warmth in winter, is cool during the warm months and is a friendly, beautiful place where children may work and live together in comfort. The overall cost of the school amounted to $11.70 per square foot. The general contractor was the Hoke Construction Company of Stillwater, Oklahoma.

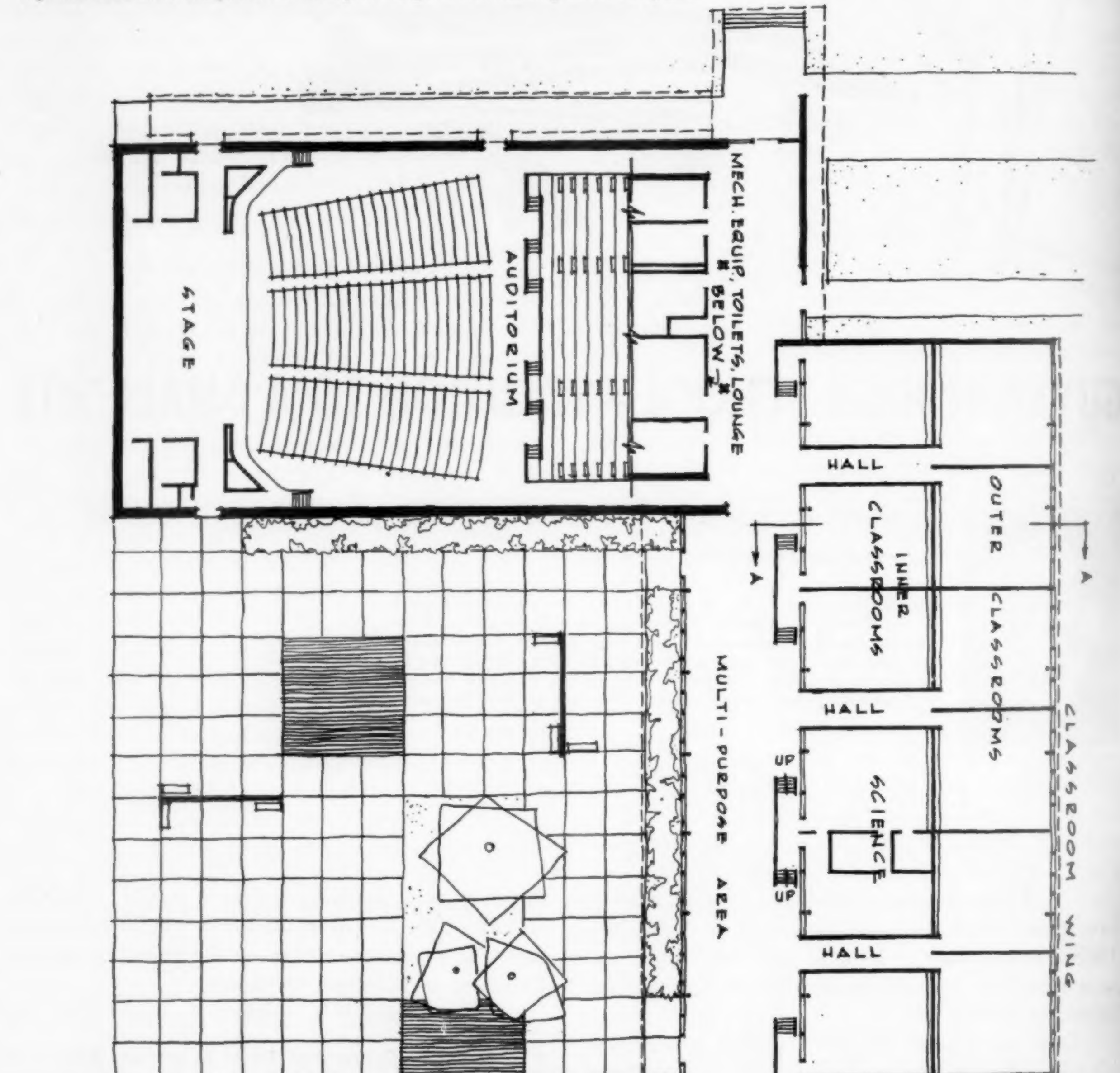
The building is a compact, L-shaped structure.

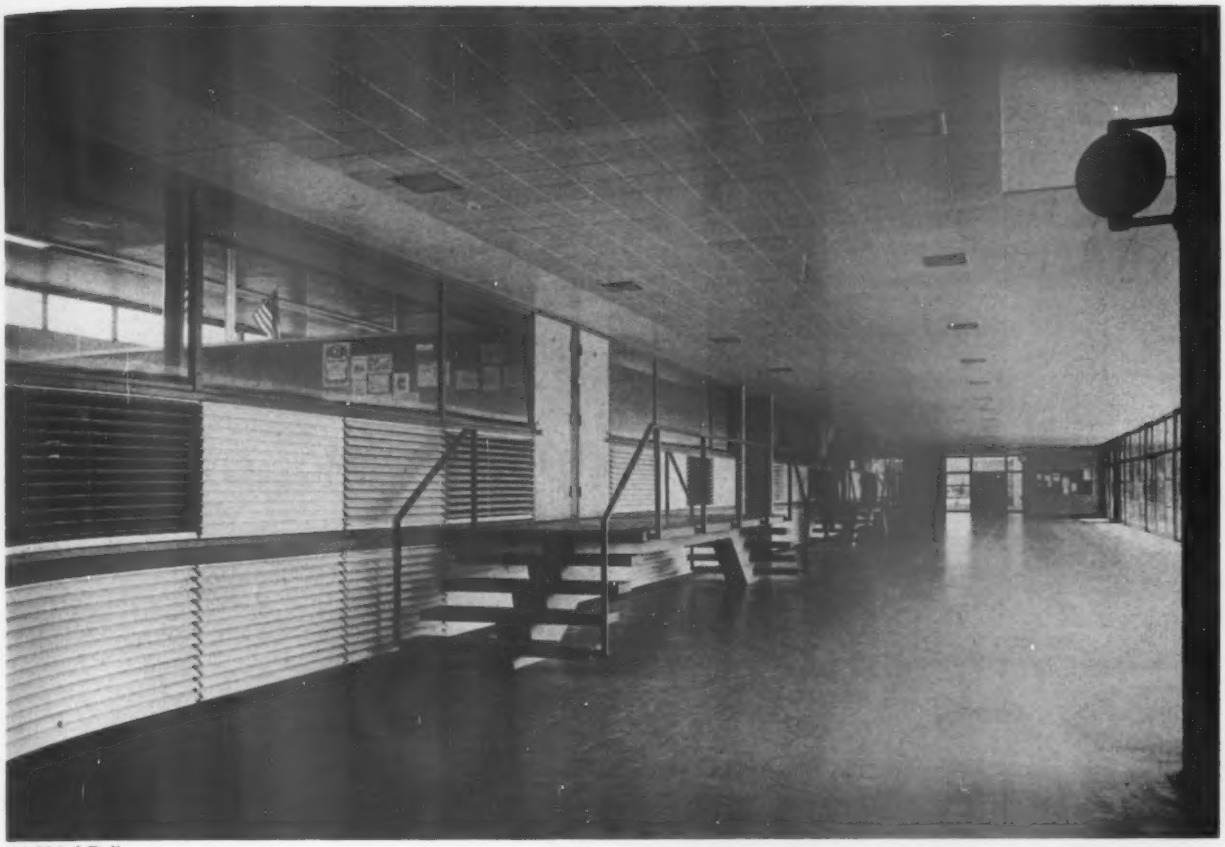
A terrace for the Guymon High School, as originally designed by the architects, will be added to the site at the next development.

The auditorium serves both community and school and seats over 1,100 persons. Seats on the main floor of the auditorium are arranged in a semi-circle. There are wide aisles, no windows and the area is air-conditioned. The stage measures 40 feet in width by 28 feet deep.

All classrooms in the Guymon Senior High School are located on the same side of a single corridor. This wide corridor is used for many student functions such

Finger halls connect the outer classrooms with the multi-purpose area of the building. The auditorium completes the L-shaped design of the building about the plaza.

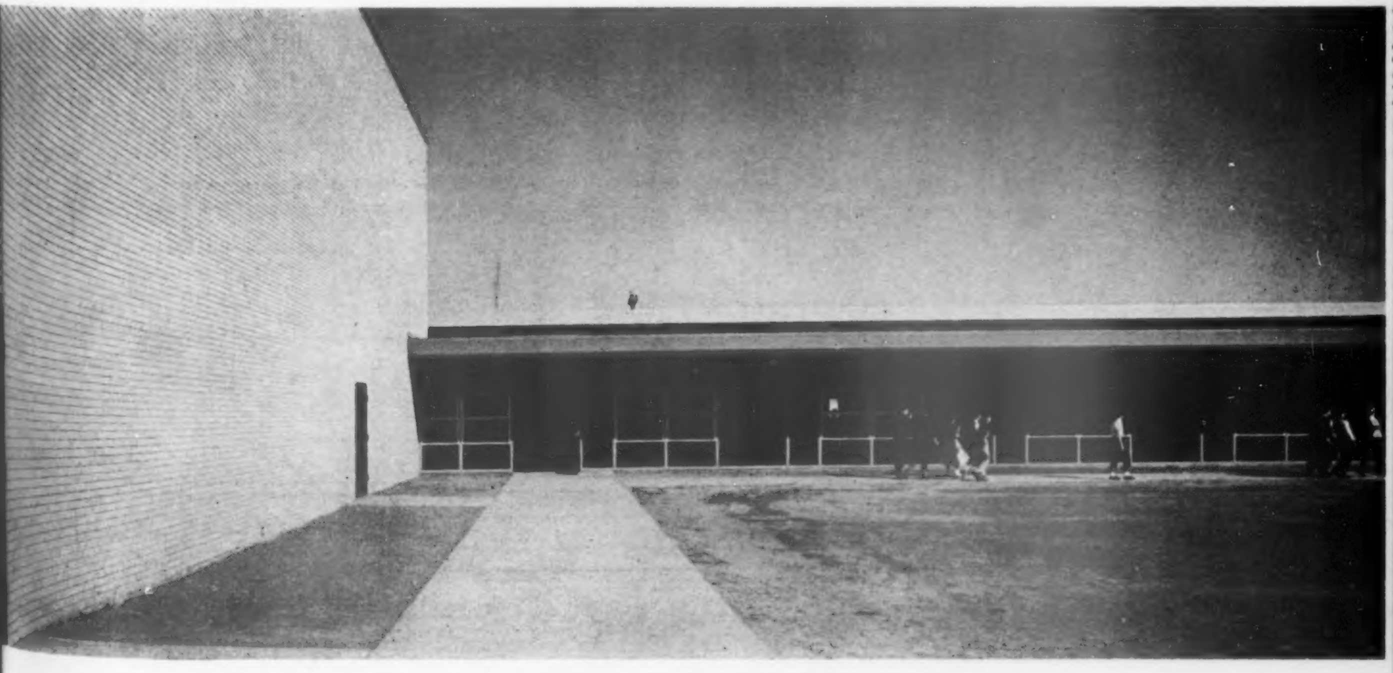




Ulric Meisel-Dallas

At the left of the student center are the interior classrooms. The upper rows of louvers provide inlets for these rooms, and the lower rows act as inlets for the leeward rooms. The windward classrooms were raised to create an air plenum space under the floor. The liberal use of glass permits those in the inner classrooms to see out in four directions.

No costly architectural devices have been added to the design to detract from the clean beauty of the lines of the auditorium mass on the left and the classroom section at the rear.



The wide, free space of the social center in the Guymon Senior High School creates a place where students really feel at home.

There is no need for traffic jams or crowding in this wide area.

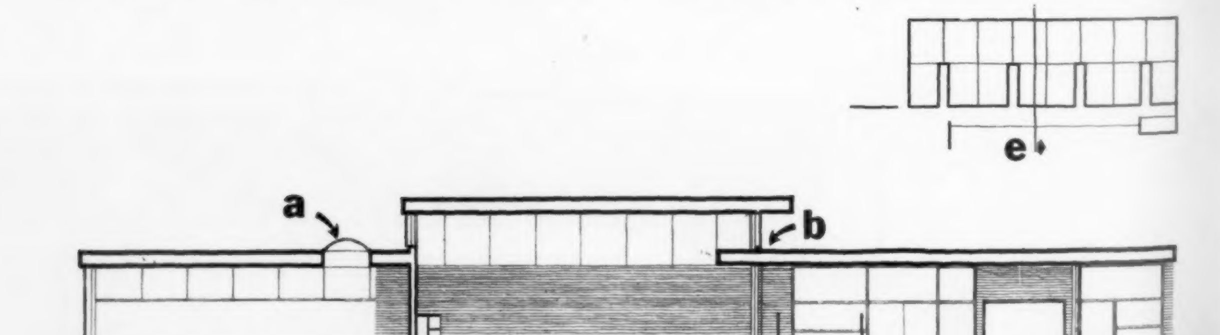
as dances and carnivals. It is also an informal meeting place for students before school and during the noon hour.

Back-to-Back Classrooms

Classrooms are placed back to back. The interior rooms are elevated to let in light at the top and air underneath. These rooms are lighted by clerestory windows. There are no window shades because light is controlled by the projecting roof overhang. Entrance to the interior rooms is obtained by five-step stairways from the corridor.

In the north classrooms an abundance of natural light is obtained through side walls of glass and plastic skylights. These rooms are ventilated by air which flows under the interior classrooms and out the north windows. Finger halls provide entrance to the north classrooms.

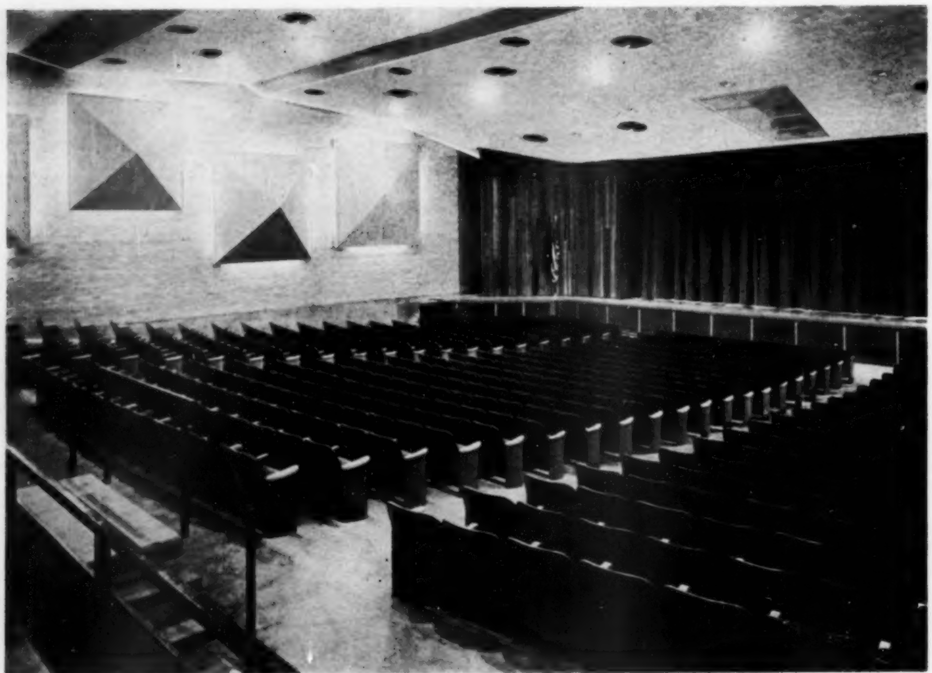
This cross-section shows: a. plastic bubble skylights in the classrooms; b. glass, protected by an overhang and inverted control device; c. air plenum chamber for cross-ventilation of north rooms; d. the student center level; e. where the cross-section was taken.



Ulric Meisel Dallas

The upper level, interior classrooms are reached from the student center by stairways. Here the louvers into the center are opened.

The reading room of the Guymon Senior High School library is located at the north end of the building, adjacent to the outer classrooms.



Ulric Meisel Dallas

The large auditorium, seating 1,100, was designed for community as well as school use. Guymon is located in the Panhandle of the state, miles away from the nearest cities, Oklahoma City and Amarillo. Community parties include performances by professional talent brought in by large concerns like International Harvester and General Electric, and the old auditorium was too small for these affairs. The acoustical pyramids were suggested by Dr. Wayne Rudmose, consultant to the architects.

Indirect lighting is provided by using the acoustical pyramids. The different size, shape and texture arrangements of the pyramids cut down the reverberation period caused by the two parallel walls. The stadium-like arrangement of seats allows a unified audience and provides a balcony on the main floor.

The cost breakdown for the Guymon, Oklahoma, Senior High School is as follows:

Bond and insurance	$ 7,568
Site preparation	10,789
Concrete	36,349
Masonry and labor	71,103
Roofing, sheet metal, waterproofing	16,843
Structural steel, misc. metal, steel sash	57,529
Carpentry and labor, millwork, chalkboards, corkboards, misc.	71,676
Lath and plaster	6,821
Roof deck	6,042
Glass and glazing	7,286
Acoustical tile	2,868
Asphalt tile, linoleum	5,979
Painting and finishing	7,909
Finish hardware	2,562
Science lab. equipment	1,537
Electrical	34,392
Plumbing and heating	75,155
Change orders	4,241
Total	$426,649

The building is one where students can live, relax and carry on cultural activities in cheerful, pleasant surroundings which promote educational, emotional and physical development.

A connecting corridor joins units of the East Hartford, Connecticut, High School. The school provides facilities for 1,500 pupils on a site of 29 acres. Architects are Nichols and Butterfield of West Hartford and Perkins and Will of Chicago.

A FIVE-UNIT HIGH SCHOOL FOR EAST HARTFORD, CONNECTICUT

by RICHARD D. BUTTERFIELD

AIA, Nichols and Butterfield, Architects, West Hartford, Connecticut

Mr. Butterfield has degrees from Dartmouth College and Yale Architectural School. He served eight years of apprenticeship in various offices and has had his own architectural practice for sixteen years, devoted mostly to public school work. In 1950 Mr. Butterfield formed a partnership with John E. Nichols, AIA, now deceased, to devote his entire practice to public school work.

"UTMOST economy" was the chief instruction to the architects, Nichols and Butterfield of West Hartford, and Perkins and Will of Chicago, engaged to design the new senior high school for the town of East Hartford, Connecticut. The school was to provide facilities for 1,500 pupils on a site of 29 acres. The site was barely large enough to accommodate all the features required for the building.

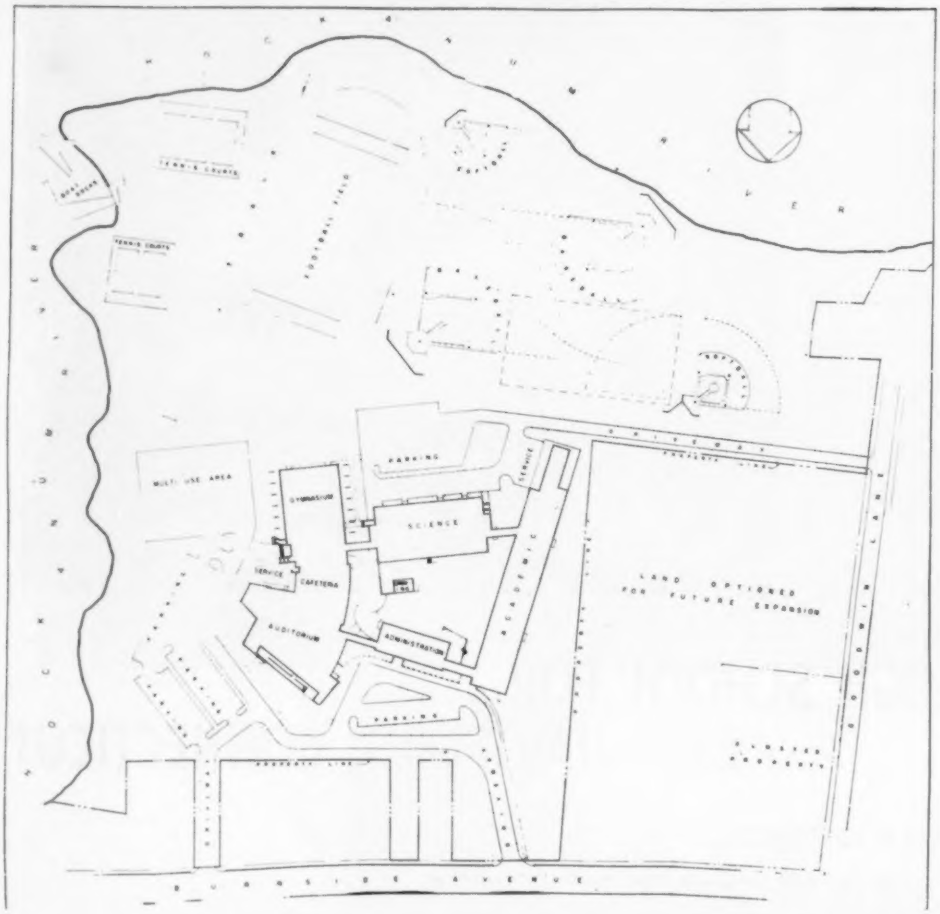
By careful planning, many of the beautiful trees on the site were maintained; further landscaping was hardly necessary. The Hockanum River forms an attractive background and insures privacy for the site. The natural slope of the land has been used to create three different floor levels for maximum efficiency and economy of construction.

The Units Are Integrated

The building committee for the high school realized that unit type construction would provide the most functional solution to the community's needs. The layout of the East Hartford High School is a plan which has the separate units of the building integrated to the site and to each other. The administration offices are central to the plan and easily accessible to the public. The classroom wing is away from the noise of Burnside Avenue and the parking area traffic. It is also oriented with east and west light, minimizing the problems of south sunlight and heat.

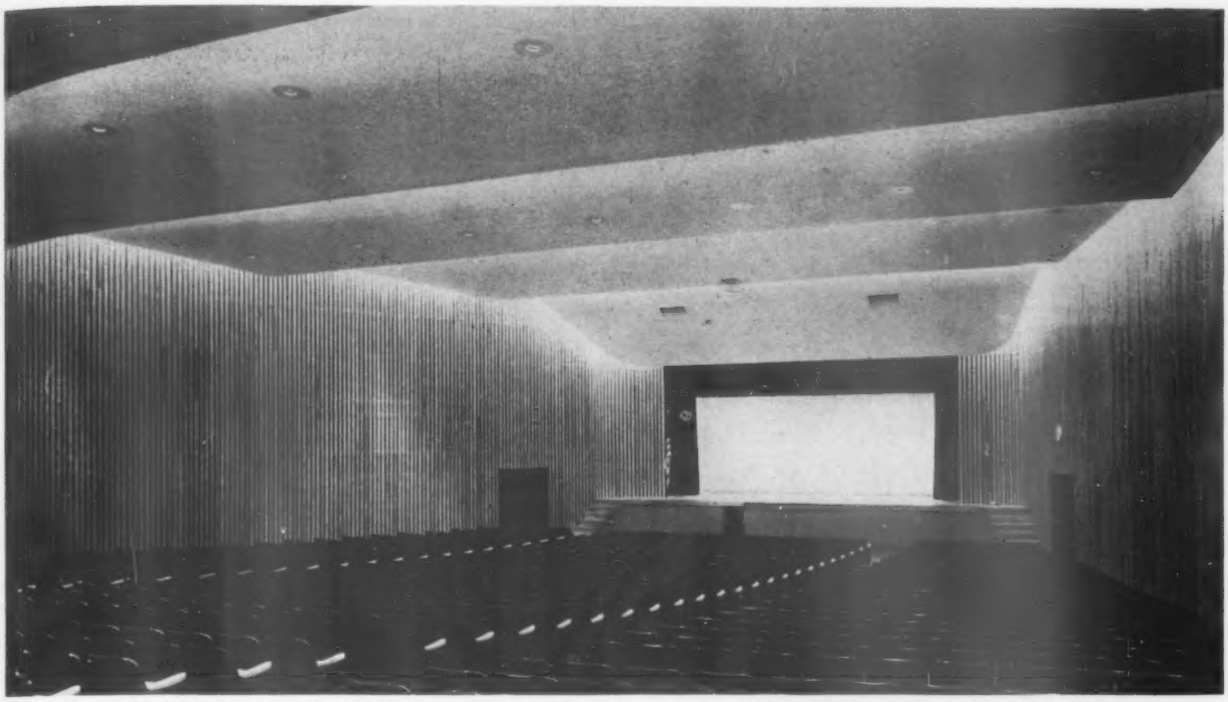
The industrial arts shops are at a lower level to segregate the noise, and they also open onto a sheltered outside work area and service court. The auditorium and gymnasium can be used at any time by the public without disturbing the remainder of the school. Large parking areas for public use are reached from Burnside Avenue. They are convenient to the auditorium and gymnasium and are hidden by the houses along the avenue, maintaining the park-like quality of the site.

The inclusion in the plan of a large central court



Site of the East Hartford High School is bounded on two sides by the Hockanum River. The land approaches are by means of driveways on the school's jutting property. To keep building area at a minimum corridors were combined with other facilities wherever possible.

The arches in the gymnasium unit are constructed of steel. The roofing is metal deck. The gymnasium has a spectator seating capacity of 1,500. The area includes shower and locker rooms, a varsity room, two visiting team rooms, office and uniform storage rooms and a corrective gym.



The auditorium of the East Hartford High School has a seating capacity of 1,200. The structure is composed of steel trusses. The auditorium, together with the gymnasium, is available for public use at any time without disturbing the remainder of the school. The first floor plan (below) shows the main units of the school in relation to themselves and to the other units. The large central court provides continuous circulation among units of the school and is also the location of the growing room for the biology department of the school.

permitted the preservation of several magnificent beech trees. The court also facilitates continuous circulation among the several elements of the plan.

To keep building area at a minimum, corridors were combined with other facilities wherever possible, as in the cafeteria, library and periodical area. The appearance and function of the long corridors of the classroom section were improved by introducing glass panels over the lockers and by carrying the corridor ceiling into classrooms. The floor tile in the corridors is in plain colors without a pattern, and the colors are changed at 50-foot intervals to shorten the apparent length of the corridor.

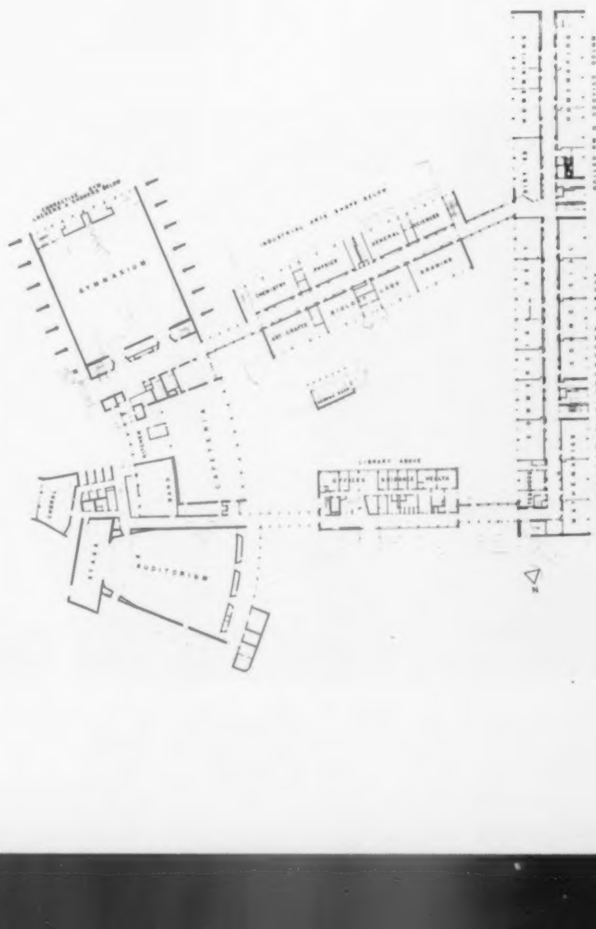
A distributive education area is located at the main intersection of classroom traffic. A large display window presents an attractive focal point, and the sales area is integrated with the classroom by means of movable storage racks.

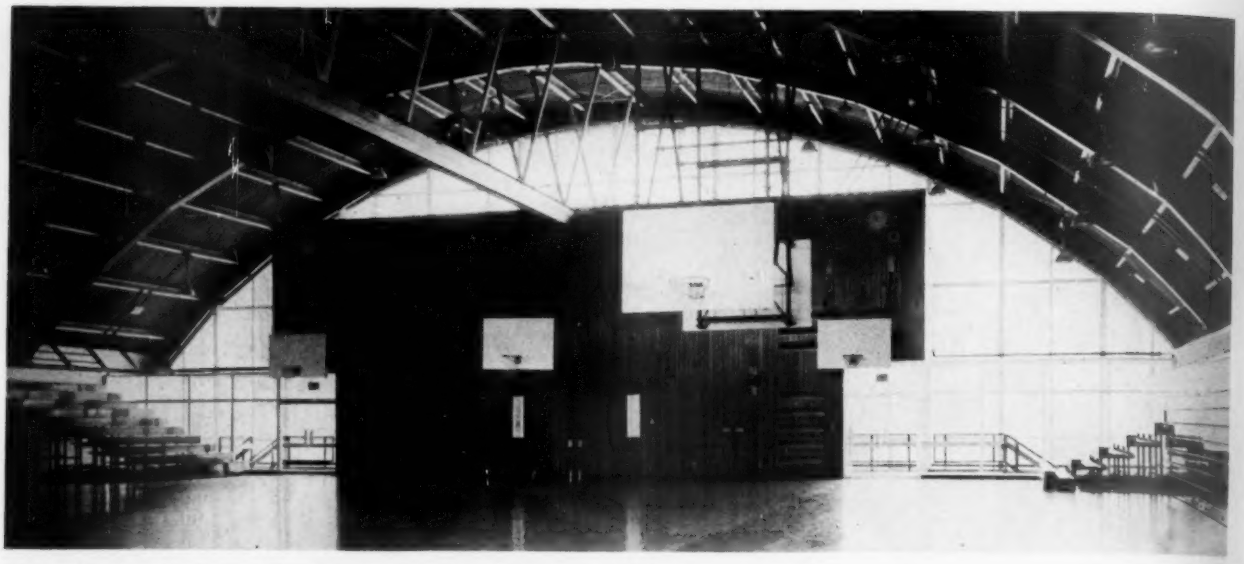
In the Library

In the library the book stacks are placed in the interior of the room, allowing floor-to-ceiling windows on the north and south walls. This location of the stacks divides the large room and avoids visual distractions, while also easing the traffic between the charging desk and the stacks. The whole library area, including the widened connecting passage where periodicals may be used, can be observed and controlled by one person at the charging desk or in the workroom.

Aspects of Construction

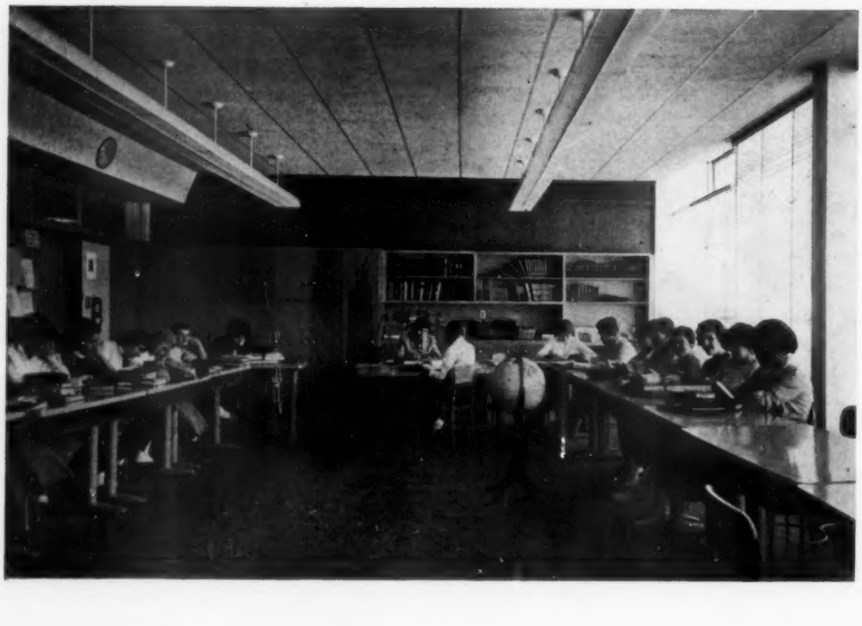
The high school was constructed and equipped at a total cost of 3.4 million dollars. The area is 187,600





Flooring in the school gymnasium is of maple. The glass expanses allow a maximum of natural lighting in the area. Folding bleachers are at the sides and are capable of seating a total of 1,500 spectators.

The cafeteria, with space for 500 diners, has its own kitchen and serving area There is a separate dining room for teachers.



Classrooms are oriented for east-west natural lighting. All glass walls are used to admit daylight and to simplify construction. Floors are asphalt tile and built-in cabinets and bookshelves are provided along the wall.

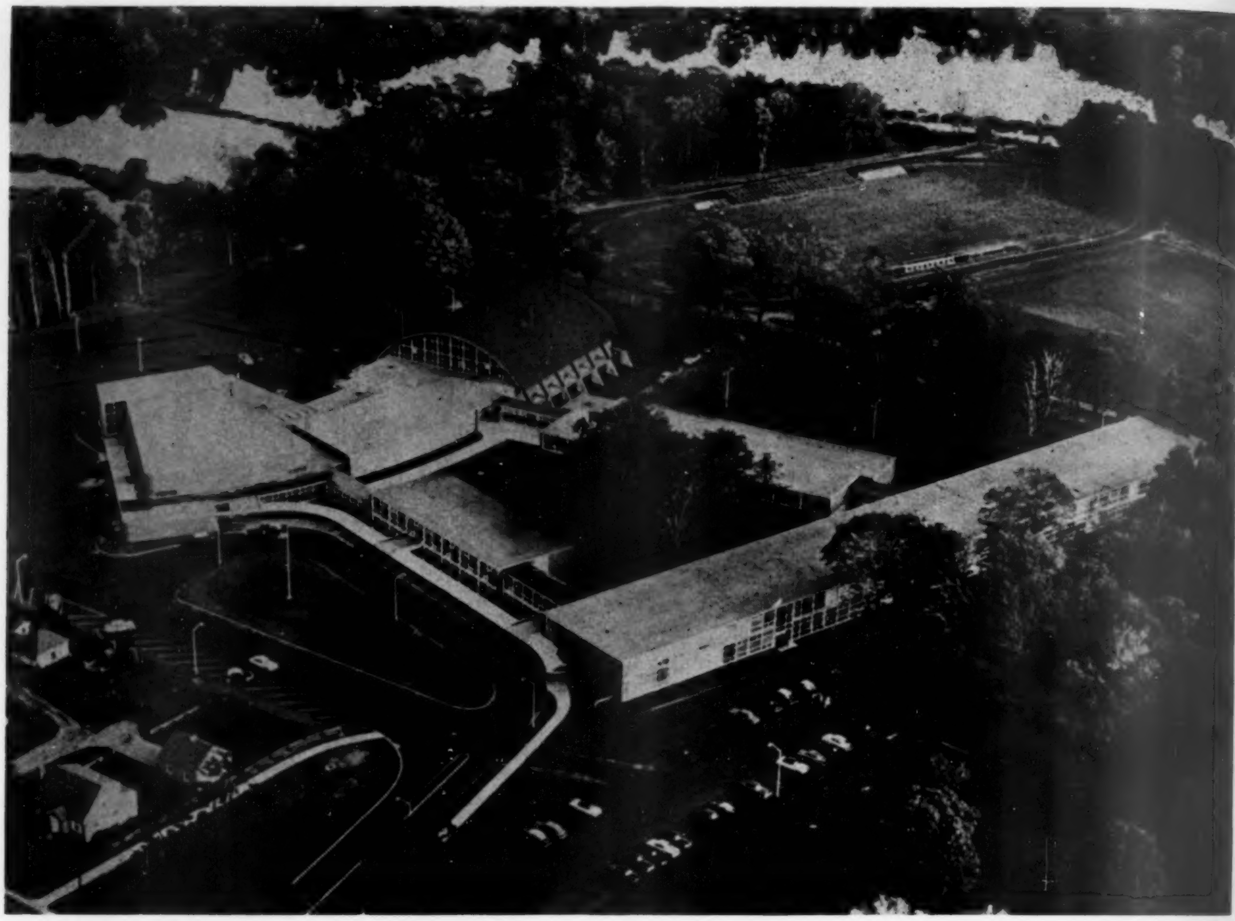
In the library the book stacks are placed in the interior of the room, allowing floor-to-ceiling windows on the north and south walls. The stacks divide the large room and cut down visual distractions.

Wood battens, like those used for the interior walls of the auditorium, are repeated in the corridor wall of the auditorium lobby.

square feet. The building was designed during the acute steel shortage of 1951 which was a contributing factor to its design. The administration and library unit, academic section and shops and science rooms have a poured concrete skeleton with a precast concrete roof. There are steel arches in the gymnasium and steel trusses in the cafeteria and auditorium.

The floor systems are concrete on earth fill with structural slab under the gymnasium and concrete topping on precast units for all other areas not on grade. Roof construction is a pyrofill deck on fiberglas formboard. The gymnasium has a metal deck. All exterior walls are brick faced cinderblock. The glass of the window walls is set in heavy wood frames.

The partitions within the building are cinderblock. Corridors, stairs, kitchen, toilets, showers and locker



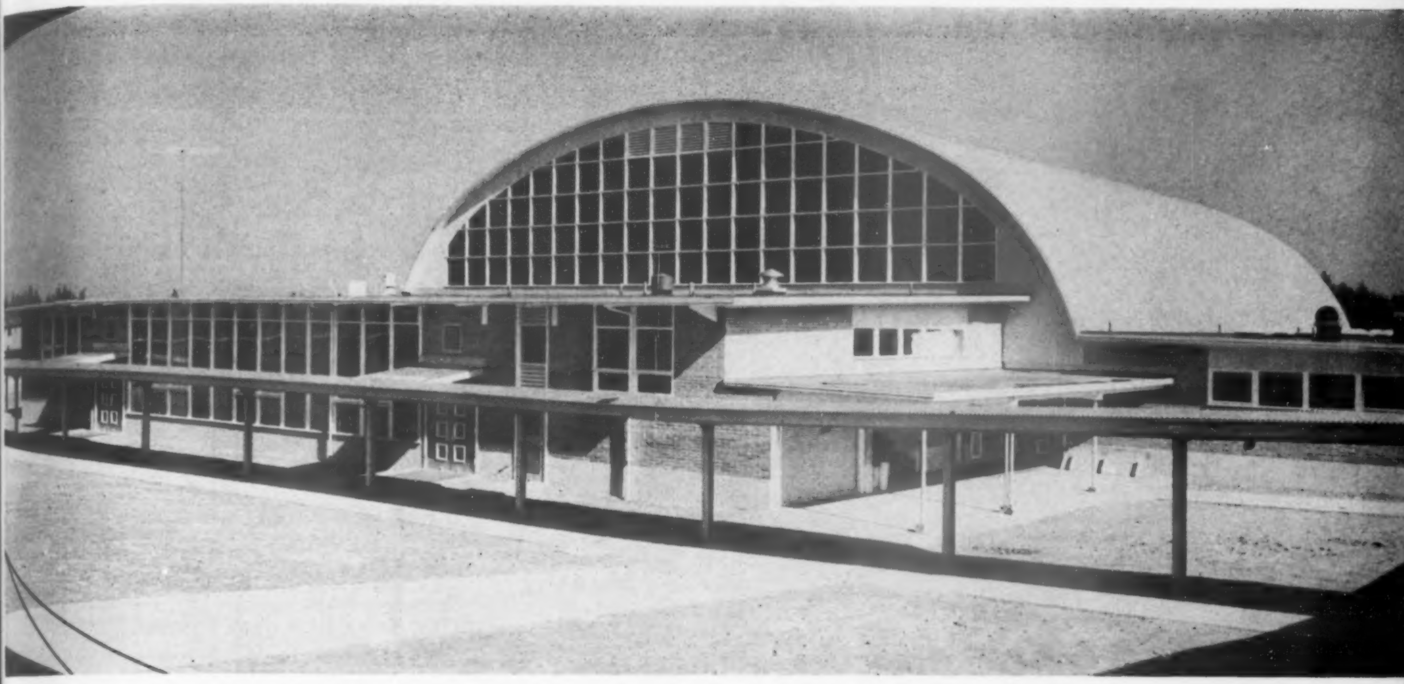
Private homes and property border the land sides of the East Hartford High School site, but approaches are provided by means of driveways. Ample parking areas are provided and spacious athletic fields are located beyond the buildings of the school.

rooms have glazed structural tile walls. Asphalt tile is the floor finish for most areas. The gymnasium flooring is maple; the shops have wood planks. Showers, locker rooms and toilets have ceramic tile floors.

The expanses of glass in walls and corridors allow a maximum amount of natural lighting. The glass also simplifies the outside wall construction. Insofar as possible, concrete construction was used for stability and protection against fire.

All ceilings are acoustical except in the auditorium and gymnasium. There is fluorescent lighting in all classrooms, laboratories and shops. The auditorium has cold cathode coves and the library has a luminous ceiling. All other lighting is incandescent.

The heating and ventilating systems are combined. Openings in the concrete floor system reduce the amount of metal duct work and provide radiant heat in the floor in addition to the regular heating system. Carbon filters not only clean dust and other matter from the air, but they purify it so that it may be reused, thereby effecting a saving in the heating costs during the winter.



A covered walkway leads to the physical education, music and cafeteria building of the North Thurston High School, Lacey, Washington. Architects are William Arild Johnson and Associates.

A NEW DISTRICT AND ITS COMPREHENSIVE HIGH SCHOOL

by CHARLES E. CALLAHAN

Superintendent of the North Thurston School District, the State of Washington

Mr. Callahan has a B.S. degree from Massachusetts State Teachers College and has completed three years of work in the Graduate School of the University of Washington. He became principal of the South Bay School in 1948 and has been in his present position since 1953.

and WILLIAM ARILD JOHNSON

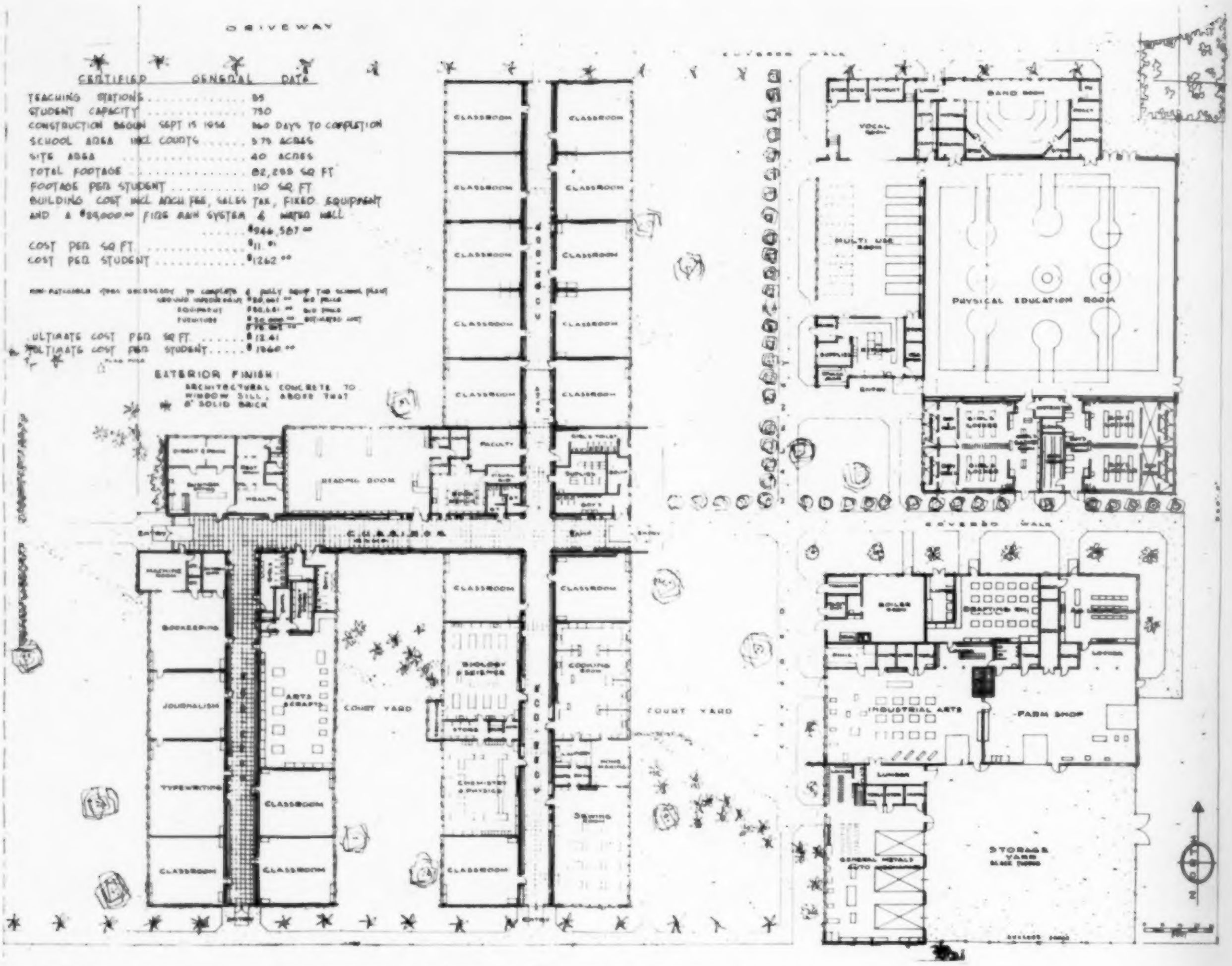
William Arild Johnson and Associates, Architects and Engineers, Everett, Wash.

Mr. Johnson is a graduate of Washington State College. He began his own practice in 1938, specializing in school architecture. Continuously engaged in school planning, he has designed schools throughout the Northwest and Alaska. In 1955 he won awards for two of his school designs.

ON November 1, 1953, the North Thurston School District, three and one-half miles from Olympia in the State of Washington, was formed—the result of balloting by patrons of two independent elementary school districts. The consolidation of the South Bay and Lacey School Districts was accomplished for the primary purpose of building and operating a secondary school which would serve the citizens of these suburban areas.

High school students from the South Bay and Lacey School Districts had been attending school in the city of Olympia. Transportation problems, overcrowding of the neighboring high school, a desire to broaden the curriculum and more local control, were chief among the factors which caused the voters to pass, by an overwhelming margin, the consolidation proposal.

A joint citizens committee from the two grade schools, together with both boards of directors, had taken part in preliminary consolidation discussions. On December 1, 1953, the district was granted legal entity. A new board was chosen from members of the old boards and the superintendent was authorized to initiate action in securing an architect for the proposed high school building. The joint Parent-Teacher Association continued to function as an advisory group to the board. On December 27, 1953, the architectural firm of



The building is planned on a four-foot modular basis. All columns and beams are exactly eight feet on centers. Three separate buildings are connected by roofed walkways.

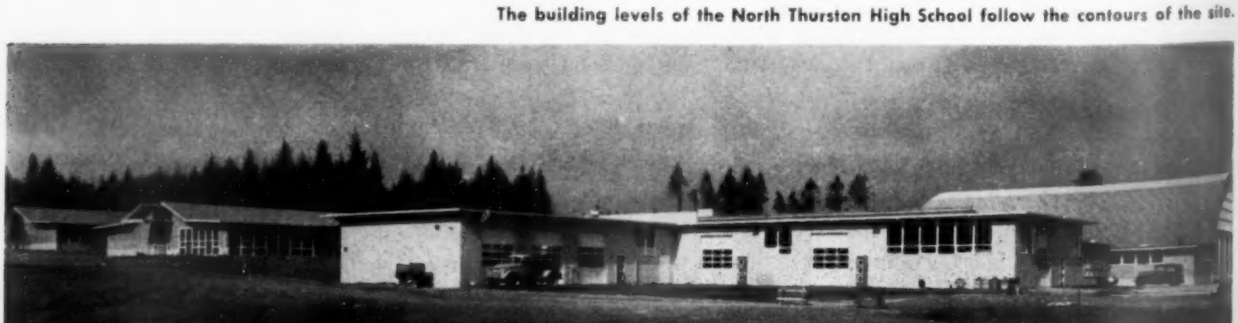
William Arild Johnson and Associates of Everett, Washington, was elected to design a structure which would facilitate the educational program being developed.

A Comprehensive Goal

A broad goal was agreed upon, namely, that this secondary school would provide facilities enabling any student to pursue studies to certify him, upon graduation, for entrance to any college or university in the state; that this secondary school would provide facilities for preparing any student for a life vocation; or both. Such a comprehensive goal, of course, required a comprehensive high school.

Other specific requirements made of the architect were that the building capacity be from 750 to 800 students, the projected enrollment for 1956; and that the building be capable of temporarily housing the

The building levels of the North Thurston High School follow the contours of the site.



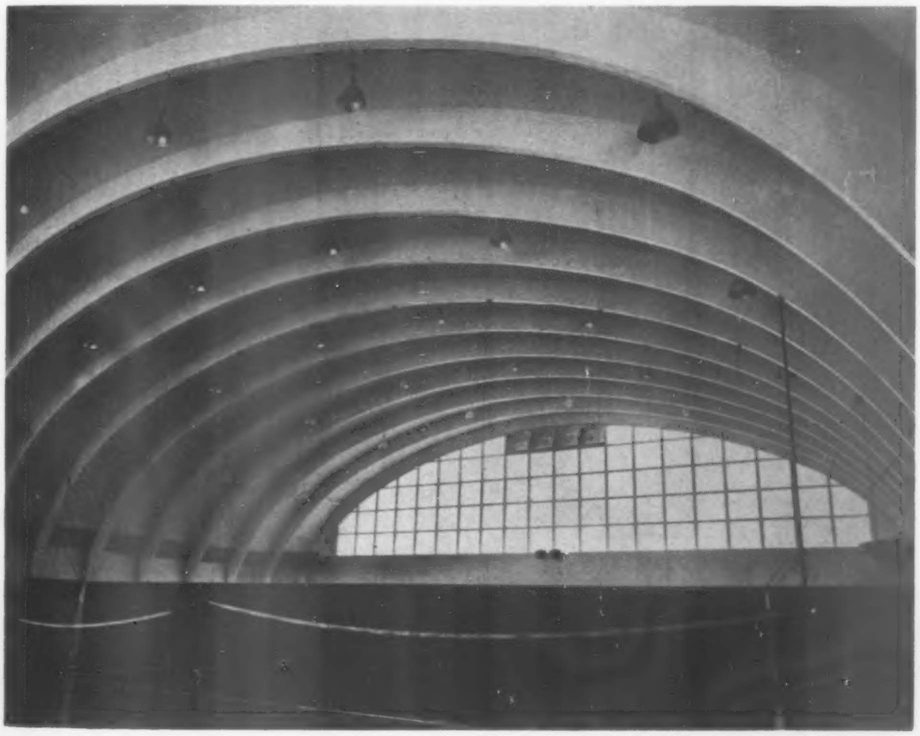
seventh and eighth grades of this district until increased enrollments made mandatory the construction of additional elementary facilities. A further requirement was that areas be designed so that high school and elementary students would be given the widest possible separation of spaces.

Specific requirements to be met included adequate space for an arts and crafts program, vocational agriculture, vocational homemaking, business education and an industrial arts program to encompass woodworking, metalworking and auto mechanics.

Overwhelming Community Support

The board of directors, through the administration, kept the people fully informed on the program and policies as they were shaped. By keeping the patrons informed and by trying to meet the expressed needs of the community, the board and administration received overwhelming community support in passing a heavy financial program to build this high school.

Forde Photo



The glue laminated arches of the physical education unit are eight feet on centers. The completed gymnasium has an unobstructed ceiling. The area is heated by a blower system.

The suburban community, with a mushrooming school population and a per pupil valuation of less than $3,000, taxed itself severely to pay for the kind of high school it wanted. The people not only passed a maximum bond issue (10 percent of the assessed valuation) but voted an additional 35 mill levy and a 30 mill levy to take effect in successive years.

Intensive planning and design work with the architect were carried on without interruption. It was absolutely essential that the building be completed and in operation by September, 1955. The building facilities then in existence could not have sufficed to carry on an adequate program. The architect had to meet a rigorous time schedule.

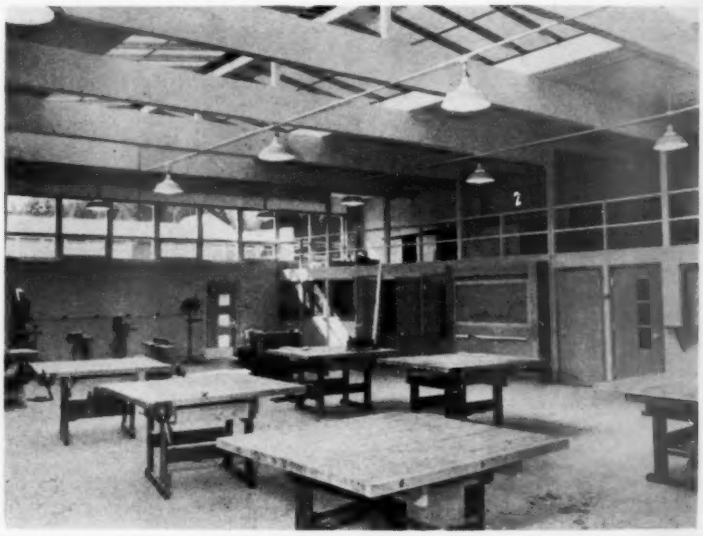
The Architect's Chief Aims

Two chief aims of the architect in developing the design were: (1) to keep the square footage cost to a minimum without sacrificing quality of material and construction; and (2) to obtain the highest possible utilization from each square foot of building space.

A semi-campus type building was decided upon.

Skylights provide daylight for the interior portion of the chemistry and physics laboratory. Lab tables are arranged around the perimeter of the room, leaving the center free for various seating arrangements and activity schedules.

The industrial arts room has a skylight of ½-inch wire glass. Incandescent lights supplement the natural daylighting of the room.



Draw drapes prevent sun glare in the sewing room of the North Thurston High School. Sewing machines fold into the table tops which then become surfaces for cutting out patterns.

The homemaking room has two kinds of refrigerators and different types of stoves in the kitchen units. Tables and chairs are provided as dining and serving areas for the homemaking students.

Maximum safety is insured in the band room with the installation of heavily notched edges on the platform risers. The folding chairs can be arranged as needed for band rehearsal use.

The plan, as finally conceived, consists of three separate buildings connected by covered walkways. The separate buildings insure excellent noise control. The main classroom section has one wing with facilities for the seventh and eighth grades, thus keeping them apart from the high school areas. Bilateral lighting was designed for good natural lighting and there are drapery controls for visual education purposes.

A gymnasium unit also contains the multi-purpose room, vocal room and band room. The third building houses the three large shops, the agriculture laboratory and the mechanical drawing classroom.

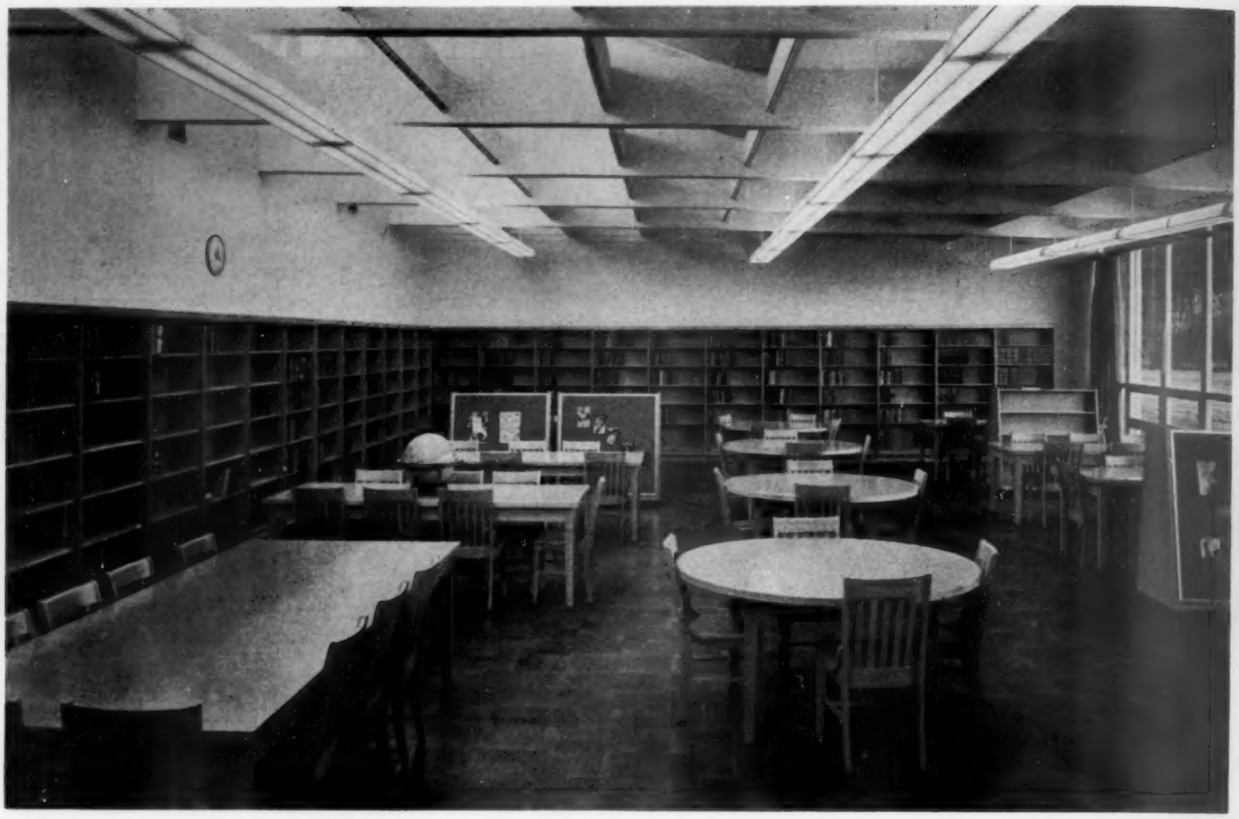
Construction started on September 15, 1954. The building was occupied and in operation on September 7, 1955. Enrollment is 412 in the high school and 260 in the seventh and eighth grades. The designed capacity is 750 or 900 with some overcrowding.

Some Desirable Features

In actual usage these desirable features of the building are manifest:

1. Excellent lighting.
2. Excellent noise control.
3. Good traffic circulation.
4. Good utilization of space and facilities.

Careful planning and designing has resulted in an excellent modern secondary plant fully capable of supporting the comprehensive curriculum and program of the original planning goal. The utmost cooperation



The library has a baffled ceiling as an acoustical device. The flooring is cork and all shelving in the area is adjustable. Rectangular and round tables are provided in the reading room.

Eggcrate clerestories illuminate interior portions of the classrooms in the North Thurston High School. Single unit desk-chairs have book racks at the sides.

The stage of the multi-purpose room doubles as a vocal room. Portable tables and benches are used for serving school lunches and are then stored in the room walls.

The wall of the administrative area is faced with Arizona sandstone. Display cases are at the left and the remainder of the corridor is lined with flush wall lockers.

The boys' locker room has ceramic tile floors and wainscots. Showers are located at the rear of the room.

Benson & Beatty Photos

among the architect, the administration, the board of directors, the lay curriculum committee and the builders resulted in an extremely well constructed building which was ready when it was needed.

Division of Areas

The North Thurston High School is situated on a site which slopes gently to a lower level area. The building is divided into three parts, partly to accommodate the grade and partly for educational reasons. One building houses the academic unit, another houses physical education, music, the cafeteria or multi-use room, and the third building houses the heating plant and school shops.

The classroom wings follow the land contours and

Bill Conser

The building is designed for a capacity of 750 to 800 students, and temporarily houses the seventh and eighth graders of the district until additional facilities can be constructed for them. Complete separation of spaces is maintained.

are oriented for east-west lighting. The high school building was given a design award at the AASA convention in Denver in 1955 and was commended for its division of units.

A very real preplanning job was done by the superintendent of schools and his staff. Much consultation and assistance were given by the State Department of Education. The educational specifications prepared for the architect were detailed and complete and proved to be of immeasurable assistance.

The building is planned on a four-foot modular basis. All columns and beams are exactly eight feet on centers. The roof is glue laminated beams with mill construction. The concrete foundation and walls extend up to the window sills. Above that is eight-inch solid brick. All rooms are bilaterally lighted, some by skydomes and continuous ridge skylights. Most of the lighting is incandescent, with fluorescent lighting in the library and reading areas.

The radiant floor heating is by oil-fired furnaces. The gymnasium and shops are heated by blowers.

The Costs Are Low

As may be seen from the following figures, costs for the North Thurston High School are low:

Certified General Data

Teaching Stations	35
Student Capacity	750
Construction, begun Sept. 15, 1954	360 days
School Area, Including Courts	3.75 acres
Site Area	40 acres
Total Footage	82,255 sq. ft.
Footage per Student	110 sq. ft.
Building Cost, including Architect's Fee, Sales Tax, Fixed Equipment and a $25,000 Fire Main System and Water Well	$946,587
Cost per Square Foot	$11.51
Cost per Student	$1,262

Non-Matchable Items Necessary to Complete and Fully Equip the School Plant

Ground Improvement	$20,661	bid price
Equipment	$32,841	bid price
Furniture	$20,000	Est. cost
Total	$73,502	

Ultimate Cost per Square Foot	$12.41
Ultimate Cost per Student	$1,360

The North Thurston High School is considered to be one of the most economical high school buildings in the State of Washington.

Photo Tech

A ramp connects the administration and gymnasium wings of the Alexander Ramsey High School, designed by Magney, Tusler and Setter of Minneapolis.

ALEXANDER RAMSEY HIGH SCHOOL—SIMPLICITY, FUNCTION AND BEAUTY

by EMMET D. WILLIAMS

Superintendent of Schools, Roseville Schools, Ramsey County, Minnesota

A graduate of the University of Minnesota, Emmet Williams also received his M.A. degree from that school and has done further graduate work there. Before assuming the superintendency of the Roseville School District in 1949, he was county superintendent of schools in Ramsey County. He has instructed summer classes at the University of Minnesota, conducting courses and workshops in school plant planning.

THIS magnificent school, situated on an expansive campus in rural Ramsey County just north of the city of St. Paul, Minnesota, is the result of two years of planning, architectural designing and just down-to-earth hard work by school officials and board members, the architects, teachers, education leaders, parents and hundreds of interested citizens.

The general educational program for which the school was built was formulated by the superintendent and school board members only after many discussions at PTA meetings and at other community gatherings throughout the district.

The detailed program for which the school is designed was laid out for the architects, Magney, Tusler and Setter of Minneapolis, after a careful survey of the community. In this the board and superintendent were aided by the findings and recommendations of a survey of the district by the University of Minnesota Bureau of Field Studies to determine school site and school plant needs.

This educational program was presented to the people of the district at a number of meetings called for that purpose and in every case it was enthusiastically endorsed. Briefly, the program asked that the high school meet the needs of each individual student; that there be a strong guidance program to aid the students in course selections and in helping both the school and the students to adjust to each other; that the junior high school should be constructed around a unified studies approach; that all learning, insofar as possi-

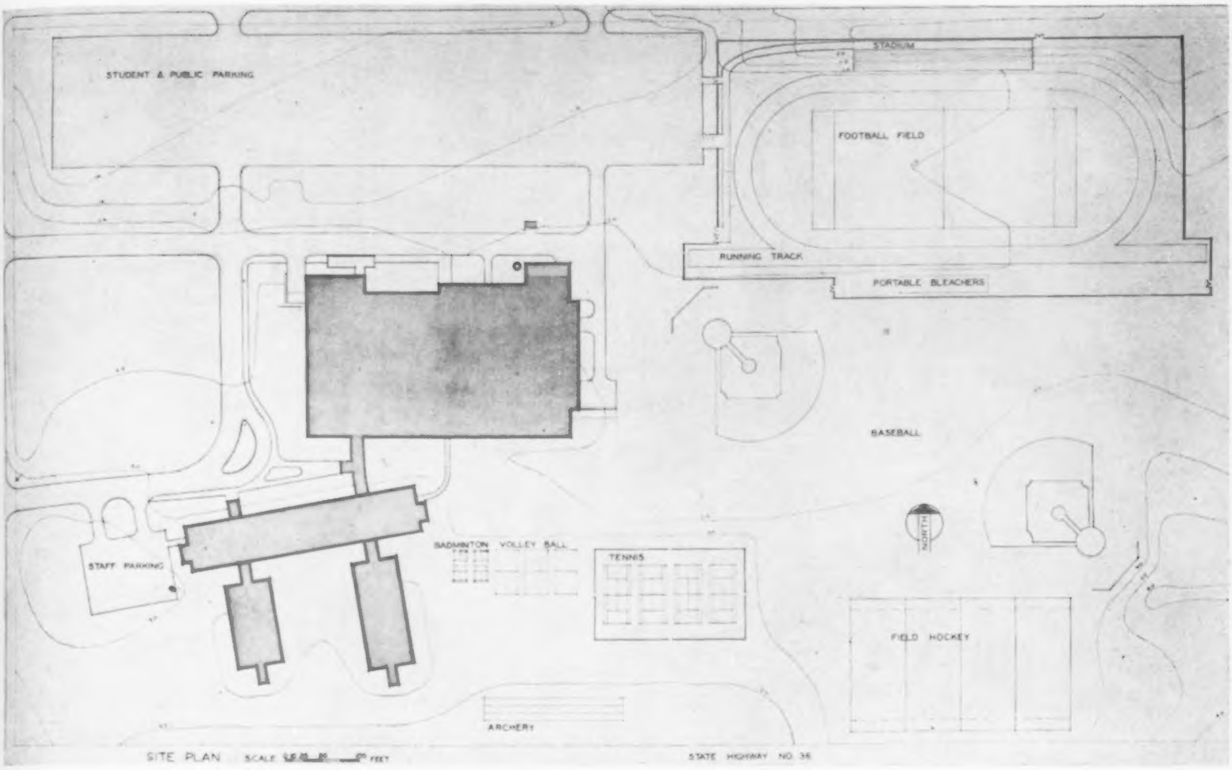
The main reading room of the library, above, accommodates 150 students. Window drapes, diffused lighting and light oak paneling provide a comfortable, restful atmosphere conducive to concentrated study. The informal reading area, left, has Eames chairs and lounge furniture. Special ceiling light fixtures highlight the display shelves.

ble, should be by pupil participation and doing; that there be no study halls and consequently all students should have opportunities for some shop, home economics, commercial, music or art courses even though they might be college bound; that instruction should be built upon large units of meaningful experiences; that athletics, music, drama and clubs be co-curricular and part of the school day program and that all boys and girls have opportunities to participate in these activities; and that the high school also offer educational and recreational opportunities to the adults.

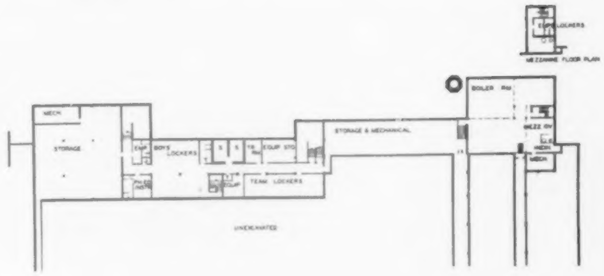
The superintendent of schools drew up a master schedule for operating a high school on a seven period day on the basis of the type of program agreed upon. This program was drawn so that each senior high school student would be enrolled in a minimum of five subjects and the co-curricular activities such as sports and music were scheduled as part of the daily program.

Determining Number of Needs

From this master schedule for 1,550 students, a breakdown was made of the number of classrooms and



Large parking areas are provided on the site for staff, student and public parking. Site development includes a football field, running track, portable bleachers, a baseball field, field hockey, tennis, badminton, volley ball and archery areas. There is a basement for the boiler room, storage and mechanical equipment, the incinerator, team lockers, boys' lockers, equipment storage and an office for the physical education instructor.



facilities needed. This breakdown was checked against the University of Minnesota Bureau of Field Studies recommendations for spaces and facilities.

Setting Forth the Space Needs

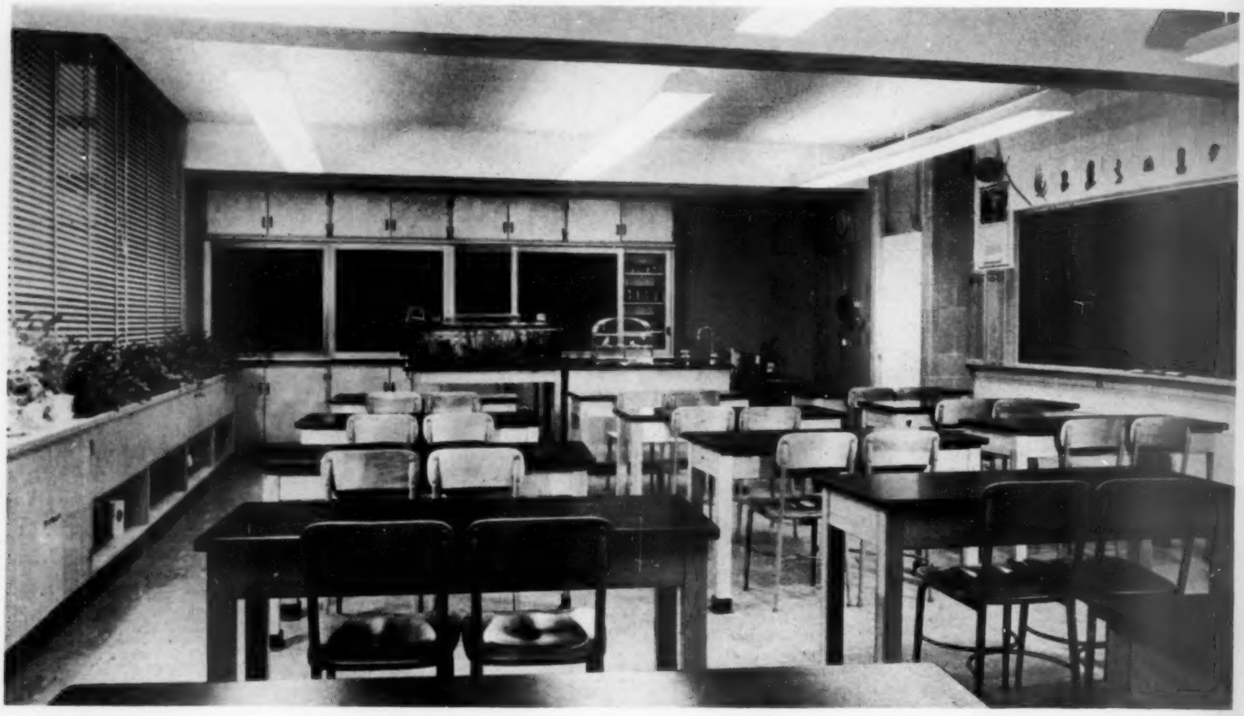
In preparing the detailed educational specifications for the architects, the superintendent and his staff decided to set forth not only the overall space needs, but the needs of each separate room or area, the activities to be carried on in each space, the equipment to be used, the shelving and storage needs and the correlation of all spaces and rooms in the school.

Educational experts and faculty members of the University of Minnesota as well as teachers throughout the Minnesota school system were asked to give recommendations and suggestions. These were evaluated by the district staff and many were incorporated in the final draft of educational specifications that became a basis for the architects' design.

The result, Alexander Ramsey High School as it is operating today, is a tribute to all of those who had a part in its inception. The spacious semi-campus type building is located on a beautiful, slightly rolling forty acre site. The school is constructed in four distinct sections or wings. The administrative wing houses, in addition to the district and high school administrative suites, the library, the science laboratories and the business education suite. The administrative wing is centrally located.

The administration and classroom wings are two story structures, whereas the gymnasium wing is of one story design. The two story wings are of poured, reinforced concrete construction with brick facing. The gymnasium wing has steel framing and a metal roof deck. Included in this large, one story gymnasium wing are the cafetorium, the music suite, the art suite, the shops, the home economics suite, the health classrooms, the shower and locker rooms and the double gymnasium.

Educationally and architecturally, Alexander Ramsey High School is built around the library, which is designed to give maximum service to students and staff.



The administrative wing has special instruction units for science and physics. Each room, 40 feet long and 24 feet wide, has the necessary equipment and storage space.

Separate junior and senior high classroom wings branch out from the administrative section of the Alexander Ramsey High School. A covered passageway leads to the physical education unit which also contains the cafeteria-auditorium, band and chorus rooms, shops and homemaking departments.

Beautiful, modern and spacious, it is the outstanding feature of this fine school. Centrally located in the administrative wing, it has a suite of rooms consisting of a professional library, a main reading room with a capacity for 150 students, an informal reading center, a conference room, a listening room, a library classroom, an office for the librarian, a workroom, a stack room and an audio-visual section consisting of a workroom, a storage room and a preview room.

The library is finished in light oak paneling and is

equipped with matching apronless tables and chairs selected for both practical and aesthetic reasons. The informal reading area and the listening room have Eames chairs and other comfortable lounge furniture.

There are open stacks located on the south side of the library where students and faculty may browse and select their own books and reading materials. Shelving capacity is 10,000 volumes.

The special departments in this wing have been designed for learning by doing. The science suite on the second floor has four laboratory-classrooms, one each for biology, chemistry, general science and physics. These classrooms are 40 feet long and 24 feet wide. Complete equipment necessary to the special design of the areas includes counter outlet electric plugs, display cabinets, electric power panel for controlled current feeding, a built-in aquarium and plant growing beds

Business department facilities include a beginning typing room (24 feet by 48 feet) and a clerical practices classroom (24 feet by 36 feet), a bookkeeping room, shorthand classroom and a large distributive education classroom (24 feet by 44 feet), a coordinator's office and two conference rooms. The entire suite is located near the offices of the administrative staff, who find it convenient to use the special calculators and other business machines provided in the business education department.

Two Academic Wings

The academic classrooms are located in two wings connected to the administrative wing, one at each end of the library. These academic classrooms—12 in one

The art studio has an inner cork wall suitable for displays and murals. Special spotlights illuminate the wall.

The homemaking department contains six individual kitchen units, each arranged and equipped like a home kitchen and each with a dining area where meals may be served.

The cafetorium is in the gymnasium wing of the Alexander Ramsey High School. The area has kitchen facilities and seating and table arrangements for serving 1,200 pupils of the school. Teachers have a separate dining area beyond the kitchen. The cafeteria doubles as an auditorium for split assemblies.

The main gymnasium floor is 100 feet by 120 feet. A second gym, on the stage floor, is 60 feet by 80 feet. The gym becomes an auditorium when the stage is in use. Roll out or pull out bleachers provide seating for 2,400 spectators during games. A girls' locker room is adjacent to the main floor.

wing and 16 in the other—are each 24 feet wide and 32 feet long. All have both open and closed shelving under the fenestration for storage and, except for the publications room and the mathematics classroom, all have chalkboard on the front wall and bulletin boards on the inside and front walls. Each room has a teacher's wardrobe closet, built-in files and a special storage case for the teacher's private use.

Continuous fenestration of clear glass and fluorescent fixtures provide adequate light. The window light is controlled in every classroom by Venetian blinds. Each room is wired and set up for the use of teaching aids, such as slide and motion picture projectors, opaque projectors, record players and tape recorders. Telephones and a public address system facilitate communication throughout the building.

Before commencing work on the architectural design, a number of questions were asked about each room and space proposed in the education planning. These were: Have the actual equipment and use of the space been carefully determined in order that enough area has been provided with no waste space being included? Will this space be used during most of the class periods of the day? If not, where can it be combined with some other functional space?

An example of this type of planning is the cafetorium located in the gymnasium wing, and which serves as the school lunchroom, as the little theatre and as the small auditorium for split school assemblies and for community events.

A Versatile Gymnasium Wing

The versatile design of the gymnasium wing makes possible a broad and varied use of this large area. The gymnasium itself is designed in two parts, the main playing floor and the stage gym. Thus, for such events as graduation, music festivals and entire school assemblies this section serves as an auditorium. In both these spaces, careful attention was given to the aesthetic qualities of the rooms as well as to acoustical treatment.

The band room has floor risers which give an amphitheatre effect and allow maximum vision for both instructor and students. Faithful tone reproduction is achieved through the use of acoustic tiling.

The woodworking shop—like the metal, electrical, printing and drafting rooms—is arranged for a learning by doing educational program.

Facilities and equipment of other departments in the gymnasium wing—which are spacious and contain a large variety of the newest working tools and materials—include the art department, the music suite, homemaking department, industrial arts, physical education and the cafetorium.

The art department is divided into an art classroom (24 feet by 44 feet), a studio (24 feet by 24 feet) and a kiln and storage room (8 feet by 24 feet). The music suite consists of a large instrumental rehearsal room, a chorus rehearsal room, two large offices, two ensemble rooms, a sectional practice room and seven small practice rooms, all with the most modern acoustical treatment.

The band rehearsal room will comfortably seat 150 members. Built-in risers on the floor assure easy vision for both students and directors. The chorus room is similarly designed.

The homemaking suite consists of a food laboratory (24 feet by 48 feet), a clothing laboratory (24 feet by 64 feet), a "living" center (24 feet by 32 feet), a combination laundry-storage room (8 feet by 24 feet) and a teachers' office and conference room (16 feet by 24 feet). The foods laboratory with its six unit kitchens, each arranged and equipped like a home kitchen and each with its own dining area, is a realistic setting for work in food preparation and sewing.

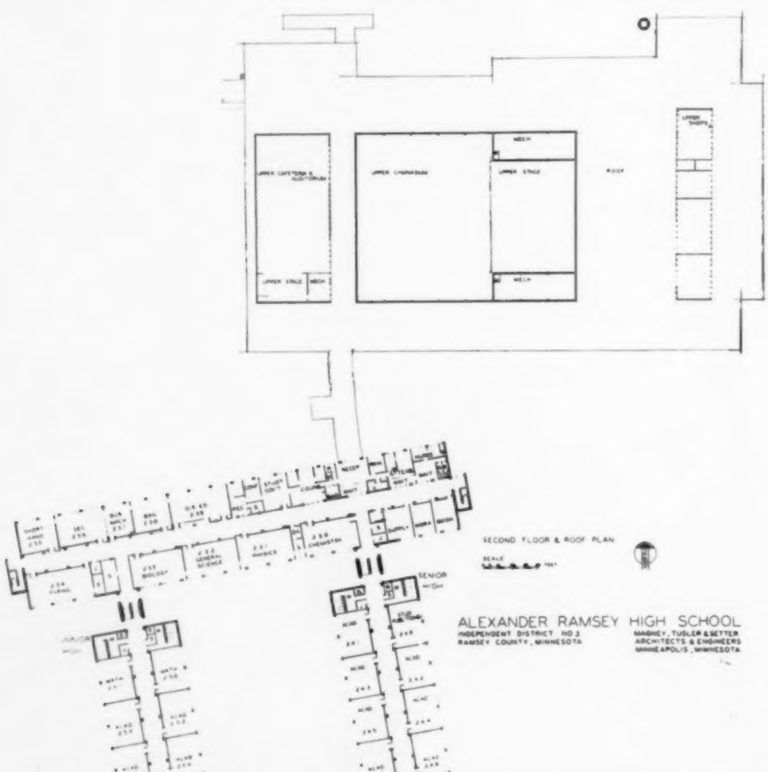
Design of the industrial arts department is such that courses may be offered to boys and girls as part of their general education. The aim is to provide a wide variety of experiences for the student by giving him an opportunity to work with tools and machines on real materials while learning the basic processes of the trade and industrial fields. This department has area shops in metal, wood, electricity and graphic arts, plus office space for instructors and a library.

Spacious Shop Rooms

The shop rooms are spacious, but not overly so. The metal and woodshop areas are each 36 feet by 56 feet. The electrical shop is 26 feet by 36 feet with an adjacent storage room, 8 feet by 12 feet, for materials. The print shop measures 26 feet by 28 feet, the drafting room 26 feet by 40 feet, and the shop library 26 feet by 32 feet. One office room (12 feet by 30 feet) is provided for the use of the instructors.

Adequate facilities for the five areas of health and physical education are included. Three classrooms are provided for health classes. The gymnasium has three teaching stations, two on the main floor and one on the stage. Each station has a full basketball floor. Roll out or pull out bleachers provide seating for 2,400 spectators in the main gym which measures 100 feet by 120 feet of clear floor space and the stage gym is 60 feet by 80 feet. Ample equipment storage is conveniently located.

The girls' locker room is on the main floor of the gymnasium wing adjacent to the main entrance, while similar boys' facilities are on the basement level. The facilities include private and gang showers, lockers and



The second floor of the administrative and classroom wings of the high school includes science rooms, business education areas, student government offices, counseling sections, academic classrooms and the principal's and nurse's offices and waiting rooms.

equipment storage. The floors of all the shower, locker and dressing rooms are radiantly heated to provide comfort to the students and to provide quick drying floors, thus minimizing the spread of fungi diseases which thrive in damp conditions.

The Kitchen and Serving Area

Layout of the kitchen and serving area, which includes all the most modern equipment, such as walk-in cooler, combination cooler and freezer, dry storage and vegetable storage, is so efficient that five persons are able each day to prepare and serve complete plate lunches to over 1,200 students and teachers.

Low maintenance and upkeep costs determined the choice of materials throughout the building, yet beauty was fully retained. Glazed, structural tile was used in all walls in the corridors, in the laboratories, in the gymnasiums, in the cafetorium and in the locker and shower rooms. Matte-finish glazed units were also used in the lower part of the classroom walls, i.e., below the chalkboard and bulletin boards.

Tile in Eleven Colors

Use of eleven different colors of tile provides beauty and lasting aesthetic qualities. Hardwood case and

The electrical shop has the latest equipment, keeping instruction and learning abreast of actual developments in the field today.

The clerical office is on the second floor and serves as a communication center, both by telephone and the audio system, for all wings.

cabinet work in natural finish is used throughout with maple predominating. Floors in the corridor and academic classrooms are of asphalt tile, but all stairways are finished with terrazzo. Rubber tile floors are found in the library rooms and quarry tile in the kitchen areas. The floors in the shops, in the music rooms and in the gymnasiums are of hardwood. Aluminum window casings, as well as aluminum flashings, were used throughout.

The heating plant consists of two oil-fired, low pressure boilers having an equivalent direct radiation of 42,500 square feet and 2,500 square feet of heating surface each, and are rated at 250-boiler horse power. All classrooms have fin-type radiation with the temperature in each room controlled by a thermostat set to the temperature desired. Air for ventilation is carried to the classrooms through a peripheral tunnel running under the outside edges of the first floor slab. Riser ducts of sheet steel carry the air up through the first floor and into the slab of the second.

Simplicity, Function and Beauty

In this new school, the architectural firm of Magney, Tusler and Setter achieved simplicity and function, and in this very simplicity and function is found a beauty not to be seen in many more elaborate structures.

In letting contracts for the construction of the school, all equipment which was to be plumbed or wired into the structure was included in the general contract. The breakdown of the general contractor's bid showed that it included $211,800 for grading and site work, $69,200 for equipment for special depart-

The wall and floor tiles in the corridors and the terazzo stairways were selected for their economical maintenance and upkeeping.

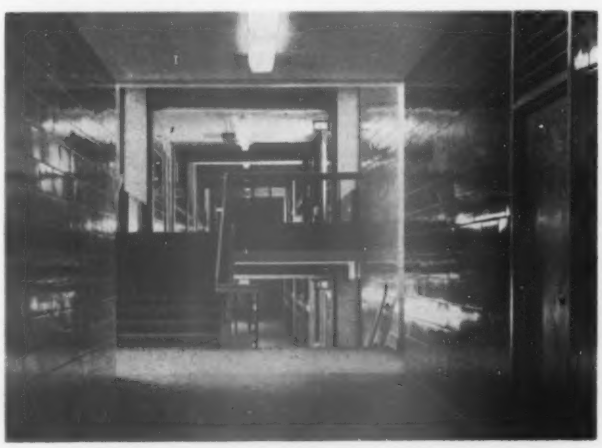


Photo Tech Photos

The enclosed ramp which connects the administration wing with the gymnasium wing emphasizes large window areas and ample space for handling heavy traffic. The main entrance to the gymnasium is at the left.

ments, $28,800 for kitchen equipment, $9,100 for stage equipment and $24,000 for sidewalks, curbs and drives. Also included in the general contract was the cost of the sewage disposal plant.

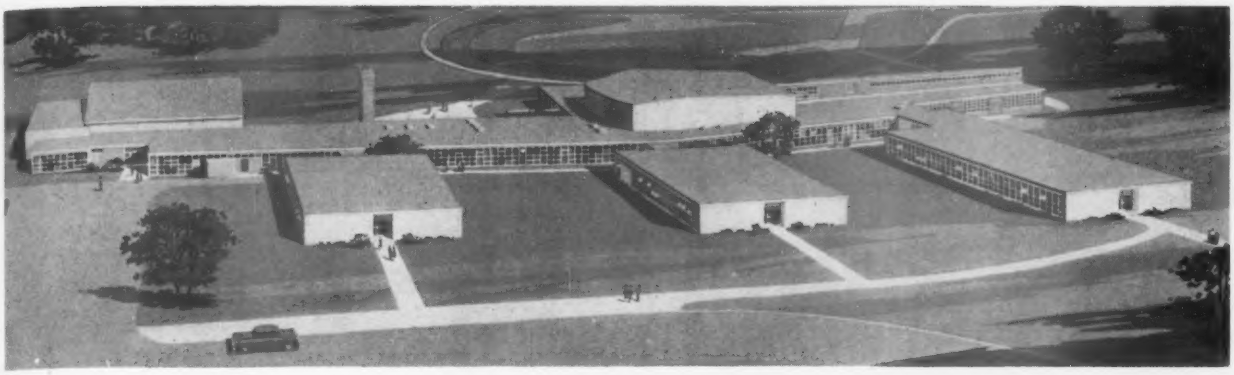
The construction contracts were as follows:

General	$1,902,650.40
Electrical	221,655.21
Mechanical	272,265.82
Well	7,234.52
Elevator	5,890.00
Ventilation	88,848.00
Temperature Controls	46,500.00
Total of all construction contracts	$2,545,043.95

The building has a floor area of 206,621 square feet and a volume of 2,648,155 cubic feet. The total of the construction contracts amounts to $12.31 a square foot and $.96 a cubic foot. Including the architect's fees raises these figures to $13.08 a square foot and $1.02 a cubic foot.

In addition to the furniture and equipment included in the general contract, $188,487.17 was spent for equipment, instruments, library books and uniforms to place the school in operation for the education program. After completion of the building itself, separate contracts were let for the athletic stadium, fencing, sodding and landscaping, and surfacing of the playcourt and parking areas. For the completed school there was expended for the site, building, fees, equipment and development of the site a total of $3,047,818.18.

Total unit costs, then, were $14.75 per square foot, $1.15 per cubic foot and $1,965.00 per student for this fine plant. The community, the teaching staff and the student body believe they have a building and an education program second to none. All believe that the school district received maximum value for dollars expended. Careful preplanning by the education staff and excellent designing by the architects made all this possible.



The site for Hudson Falls High School, a former airport of 96 acres, selected for its proximity to student population centers, lent itself to a finger plan type of design.

HUDSON FALLS HIGH SCHOOL—A LOW COST MARBLE PALACE

by MILO D. FOLLEY

Chief of Design and Research, Sargent-Webster-Crenshaw & Folley, Architects, AIA, Syracuse, New York

Mr. Folley graduated from Syracuse University with a B.A. degree in 1938. He received a scholarship to the University of Pennsylvania and earned his M.A. degree in 1941. The American Institute of Architects registered him in 1945 at which time he joined the firm of Sargent-Webster-Crenshaw & Folley. His position is that of Chief of Design and Research.

WHEN a school district votes itself a whole new set of schools, it proves that it realizes how important education is, especially when taxes must climb to meet the burden. Such is the Hudson Falls Central School District, a rural community with the village of Hudson Falls as its main populated area. This area of 10,000 people is located adjacent to Glens Falls, New York, on the banks of the Hudson River.

The town is supported by various industries of both light, heavy and miscellaneous businesses, including agriculture. The school board is represented by the whole scale and has approached the school problem with a clear business-like attitude.

When the student population began to outgrow its antiquated space, the board squared itself to the problem and secured the services of a team of educational consultants, Engelhardt, Engelhardt & Leggett, of New York City, who proceeded to analyze the growth trend and other problems of the district. The consultants interviewed the staff concerning the proposed program, investigated the community's social needs and reviewed past growth with an experienced eye on future capacity.

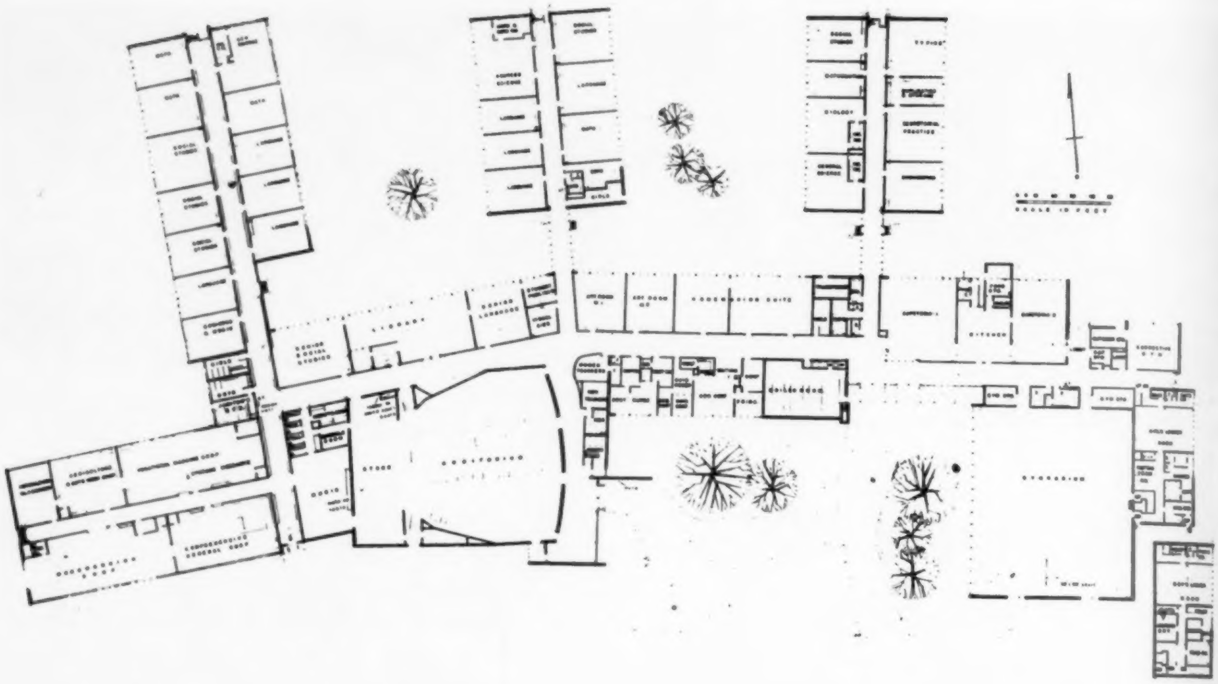
In addition to several elementary schools, they suggested a 900-capacity junior-senior high school which later could be made into separate senior and junior high schools, loosely interconnected. The sites were selected for their proximity to student population centers. The high school was located on a former airport having some 96 acres of flat sandy soil with irregular scrub growth.

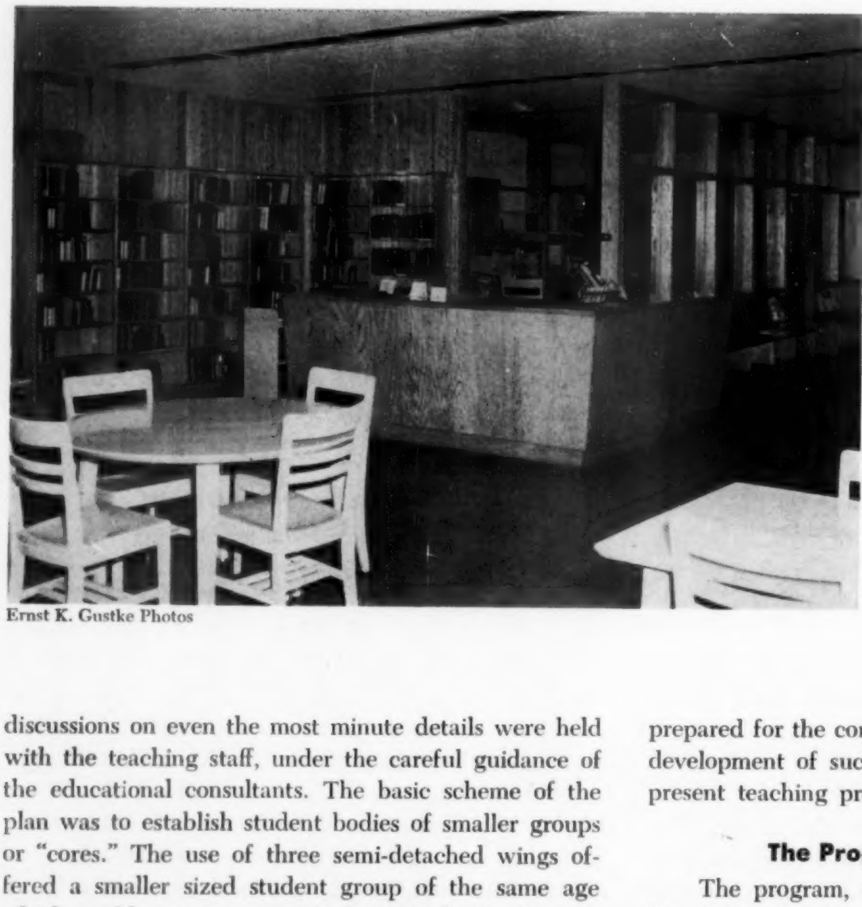
Architects for the Building

At this point the board selected the firm of Sargent-Webster-Crenshaw & Folley as architects for the high school. The firm maintains offices at Syracuse, Watertown, Schenectady, Plattsburg and Corning, having one of the most complete and experienced staffs in New York State. Now the program got underway in earnest, with conferences between staff and professionals, and between professionals and the board.

The architects and engineers analyzed the site for quality of soil, drainage, foundations and development costs, and type of construction most suitable. As a result of this intense effort, the board approved a finger plan estimated to cost $1,450,000 for the building, with a total budget of $1,843,000.

After an approval by the voting populace, serious





Ernst K. Gustke Photos

Good site utilization and area groupings of buildings by related functions characterize Hudson Falls High School, Sargent-Webster-Crenshaw & Folley of Syracuse, N. Y., architects. The floor plan (above) indicates isolation of shops, music rooms and gymnasium for noise control. The library is located centrally to academic wings. At the left is an interior view of the library showing the use of oak flooring for wall finish. This material helps to maintain a quiet feeling in the library. The librarian's desk controls entire room including the work and storage area.

discussions on even the most minute details were held with the teaching staff, under the careful guidance of the educational consultants. The basic scheme of the plan was to establish student bodies of smaller groups or "cores." The use of three semi-detached wings offered a smaller sized student group of the same age which could act as a separate learning body, depending on the central group for only the specialized subjects. Although the teaching staff felt they were not prepared for the core program, the plan allowed future development of such a program, while answering the present teaching program of the "homeroom" variety.

The Program, As Constructed

The program, as developed, was as follows (the first listing is the program established by the consultants, the second is the final state approved "as constructed" program):

	Consultants' Program		*As Constructed*	
	Quantity	*Area*	*Quantity*	*Area*
Language Arts				
English Laboratories	4	900 sq. ft.	4	660 sq. ft.
Dramatics Classroom	1	1200 sq. ft.		
Senior English Classroom	1	750 sq. ft.	1	870 sq. ft.
Journalism Laboratory	1	1200 sq. ft.	1	760 sq. ft.
Latin Classroom	1	900 sq. ft.	1	660 sq. ft.
Modern Language Classroom	2	900 sq. ft.	2	520 sq. ft.
Social Science				
Social Science Laboratories	6	900 sq. ft.	4	760 sq. ft.
Mathematics				
Elementary Math Laboratories	2	900 sq. ft.	2	660 sq. ft.
Advanced Math Laboratory	1	1000 sq. ft.	1	760 sq. ft.
General Math and Science	1	1000 sq. ft.	1	760 sq. ft.
Small Math Room			1	520 sq. ft.
Physical Science				
General Science Laboratories	2	900 sq. ft.	1	860 sq. ft.
General Science Project Rooms	2	250 sq. ft.	1	140 sq. ft.
Biology Laboratory	1	1000 sq. ft.	1	750 sq. ft.
Preparation and Storage	1	200 sq. ft.	1	120 sq. ft.
Physics-Chemistry	1	1200 sq. ft.	1	870 sq. ft.
Project, Preparation and Storage	1	200 sq. ft.	1	200 sq. ft.
Darkroom	1	300 sq. ft.		
Library Alcove			1	110 sq. ft.
Meteorological and Astronomical Laboratory on Roof	1			
Business Education				
Elementary Typing Laboratory	1	900 sq. ft.	1	890 sq. ft.
Advanced Typing Laboratory	1	900 sq. ft.		
Office Practice Room	1	900 sq. ft.	1	840 sq. ft.
Laboratory of Salesmanship	1	900 sq. ft.	1	770 sq. ft.
Repair and Storage Room	1	150 sq. ft.	1	420 sq. ft.
Homemaking				
Foods Laboratory	1	1000 sq. ft.	1	870 sq. ft.
Utility Room	1	200 sq. ft.		
School Hospitality Center	1	500 sq. ft.	1	1290 sq. ft.
Clothing Laboratory	1	1000 sq. ft.		
Art				
Studio for Arts and Crafts	1	1200 sq. ft.	1	750 sq. ft.
Music				
Band Room	1	1600 sq. ft.	1	1290 sq. ft.
Choral Room	1	1200 sq. ft.		
Director's Office	1	100 sq. ft.		
Library	1	50 sq. ft.		
Storage for Band Uniforms	1	50 sq. ft.		
Instrument Storage	1	100 sq. ft.	1	200 sq. ft.
Practice Rooms 5.3 x 8	4	200 sq. ft.	4	42 sq. ft.
Practice Room 10 x 15	1	150 sq. ft.	1	200 sq. ft.
Vocational and Industrial Arts				
Machine and General Metals Shop	1	3200 sq. ft.	1	2890 sq. ft.
Auto and Engine Mechanical	1	1600 sq. ft.	1	1080 sq. ft.
Woodworking	1	2200 sq. ft.	1	3500 sq. ft.
Drafting Room	1	900 sq. ft.	1	600 sq. ft.
Comprehensive General Shop			1	2100 sq. ft.
Agricultural Classroom			1	630 sq. ft.

	Consultants' Program Quantity	Consultants' Program Area	As Constructed Quantity	As Constructed Area
Auditorium				
Seating for 900	1		1	
Lobby and Exhibit Hall	1		1	
Public Toilets	2		2	
Stage	1		1	
Dressing Rooms	2	1000 sq. ft.		
Storage Room	1	200 sq. ft.		
Stage Craft Shop	1	1200 sq. ft.		
Library				
Reading Room for 75	1	2250 sq. ft.	1	1980 sq. ft.
Library Workroom Office	1	150 sq. ft.	1	160 sq. ft.
Magazine Room	1	150 sq. ft.		
Conference Rooms	2	250 sq. ft.	1	130 sq. ft.
Audio-Visual	1	150 sq. ft.	1	240 sq. ft.
Physical Education				
Field House	1	96 x 82	1	96 x 82
Administrative Offices	2	300 sq. ft.	2	175 sq. ft.
Small Game Rooms	2		1	725 sq. ft.
Locker and Shower Rooms, Toilet Rooms, Storage Laundry			Included	
Cafeteria				
Dining Area for 300, Subdivided		3300 sq. ft.		2940 sq. ft.
Kitchen with 2 Serving Lines	1	800 sq. ft.	1	800 sq. ft.
Food Storage	1	200 sq. ft.	1	110 sq. ft.
Cold Storage	1	50 sq. ft.	1	45 sq. ft.
Supply Storage	1	100 sq. ft.	1	100 sq. ft.
Can Washing Area	1	100 sq. ft.		
Help's Toilet and Lockers	1	100 sq. ft.	1	40 sq. ft.
Staff and Student Services				
Student Publication Office	1	500 sq. ft.	1	240 sq. ft.
Student Organization Office	1			
Guidance Offices	2	800 sq. ft.	2	500 sq. ft.
Testing Room	.			
Vault				
Reading and Waiting Space				
Health, Waiting and Nurse	1	575 sq. ft.	1	575 sq. ft.
Examination Room				
Dressing Rooms	2			
Audiometer Examinations				
Toilet, Boys and Girls Rest, Storage				
General Office	1		1	
Principal	1		1	
Record File and Vault	1		1	
Storage and Mimeograph	1		1	
Teacher Work and Conference	1		1	
Teachers Lounge Suite	1 men, 1 women		1 each	
Service Facilities for Boiler Room				
Janitor Work and Storage Area			included	

Total Proposed Teacher Stations 41 @ 28 pupils (80 percent utilization)

The total area constructed was 97,124 square feet at a building cost of $14.17 per square foot and a cubage of 1,497,546 cubic feet (based on State Education Department formula) at $0.92 per cubic foot.

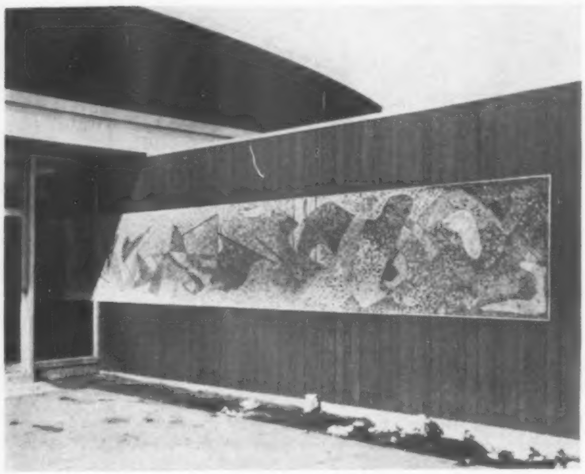
In discussion with teacher groups the subject of study halls arose and it was decided that this space could be put to better use as classrooms. The subdivision of the cafeteria allows for study use in case such a need develops. The board felt that the community requirements for social activities would require seating in the auditorium for 910. In the design of the locker area they also felt that the future addition of a

pool would require a split level scheme in order to permit direct access to the pool.

The sandy soil afforded an economical base for concrete foundations carrying a light steel frame with bar joist floor and roof. The walls were optional construction to the contractor, allowing him a hollow steel stud or a concrete block backup, with a sawed white marble veneer from a nearby quarry. Stained cypress boarding was used to add warmth to the administration area. Corrugated aluminum was used on the shop area and for insert panels. It was found that window panels going from floor to ceiling were most economical and improved the feeling of unity with nature. The architects preferred a vertical louvered drape to shed the glare but yet provide visual openness.

Roofs, Ceilings and Walls

The roof deck, which is left exposed in many areas, is a light-weight insulating slab of impregnated wood fibers, having a high rate of sound absorption.

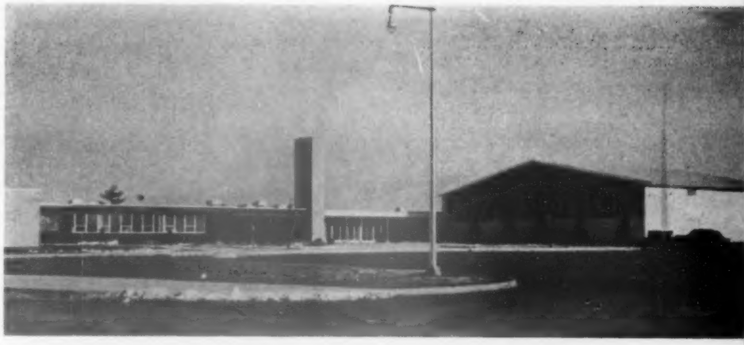


An abstract glass mosaic mural by Larry Argiro, depicting the development of education, stands at the auditorium entrance.

Corridor floors are of terrazzo with an inexpensive tile base set flush with the plaster. Walls are of hollow metal studs, rock lath and plaster. Walls in traffic areas are covered with vinyl wall finishes in attractive patterns. Wall surfaces at the rear of classrooms are entirely of ¼-inch sheet cork, as are display areas along the corridors.

Many areas, such as lobbies, gymnasium, auditorium and game rooms, are finished in tongue-and-groove vertical ½-inch thick oak flooring, an economical product generally used only in low cost housing. This wall material offers permanency with resiliency especially suitable for gymnasium wainscoting.

A new and startling material, Italian glass mosaics, was used to ornament the corridor drinking fountain recesses. These are in ⅜-inch squares of vivid permanent colors set in white cement, and give one a new sensation not ordinarily found in educational structures.



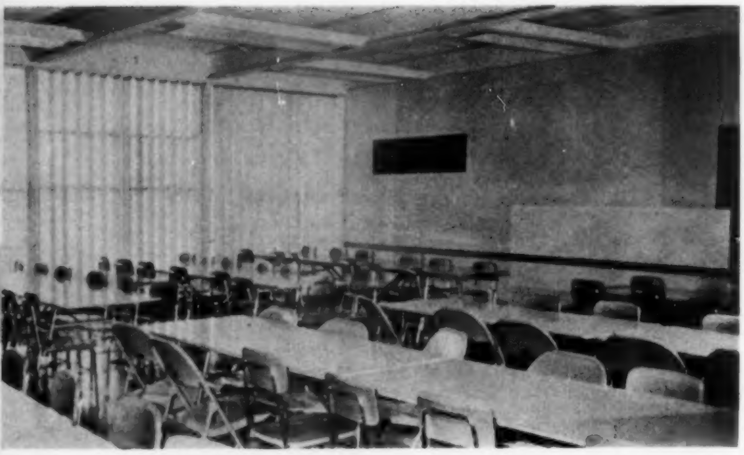
The parking area adjacent to the gymnasium entrance is used for gym play during the day and for social event parking at night.

Classroom floors are asphalt tile; floors and walls of toilet rooms and kitchen are ceramic tile. Ceilings throughout are mineral fissured acoustic tile with recessed fluorescent light for an intensity at desk level of 42 foot-candles. Classrooms and other similar areas have a ceiling height of nine feet.

A new system of air heating was designed by the architects. This system produces 100 percent air heating (and ventilation). Experience has shown that classrooms are more apt to be overheated than underheated. This is because quantities of standing radiation, when once heated, find no outlet for their heat as the sun and population load produce more heat than the classroom requires. When a heating system can reduce its volume of material necessary to provide heat, then overrun and lag can be reduced. Air used as the heating medium can be transferred to the cooling cycle at a moment's notice and, because of its greater flow, can produce tremendous cooling possibilities for marginal weather.

The Hudson Falls system consists of three natural gas fired boilers which provide low pressure steam to tempering coils in each building wing. From central fans at these locations air is forced through individually controlled room coils to bring each area to the required

The homemaking department's foods laboratory has oak finish kitchen cabinets, wall oven with matching counter top burner units.



Composition vinyl fabric lines cafeteria walls; acoustical roof deck is painted, left exposed with fluorescent light underneath.

temperature. The air enters the classrooms through grilles at the window sill and is withdrawn through the backs of the vented lockers. This air path "washes" the room with fresh air and kills down draft from windows. The system provides well vented student lockers and eliminates that "schoolhouse odor."

Bids were taken in April, 1954, and the following budget is the cost of the project to date:

General		$1,042,161
Plumbing		106,591
Heating		116,890
Ventilating		47,524
Electrical		133,081
Site		91,894
(Site Cost	$75,000)	
Professional Services		102,102
Equipment	79,000	
Built-in	32,000	
Overhead and Interest, Insurance, etc.		12,000

Construction contracts were awarded to the following low bidders: general construction, Consolidated Constructors, Inc., of New York City; plumbing, Trojan Hardware Company of Troy, New York; heating, Tougher Heating and Plumbing Company of Albany, New York; ventilating, Gray & Russell, Inc., of Rensselaer, New York; electric, Cortright Electric of Ithaca.

Construction proceeded under the watchful eye of the clerk-of-the-works, a member of the architects' staff, hired by the board.

Midway in the construction the architects requested the board to consider monies for an art work to be placed at the entrance to the auditorium. Although the board felt that they could not use school funds for the design, they did feel that it was necessary; so the members of the board offered to accept monies toward this endeavor and did guarantee several thousand dollars for the commission. The architects suggested an artist and the board approved.

Professor Larry Argiro of the State Teachers College at New Paltz designed and executed an abstract mosaic depicting the development of education from the period of trial and error to the future of ultimate knowledge. The board agreed with the architect that any mural should have a depth which would hold the attention of the pupil throughout his school period. A realistic type of art may have lost the student's interest after the first few viewings, whereas the abstract panel will always offer a new aspect for his progressively more adult mind.

Many problems of delayed material hindered the construction progress, one of them inadvertently was a godsend. This delay prevented the building from being

Living center of homemaking department shows intimate use of oak paneling. Built-in equipment is part of the construction contract.

enclosed during the winter and so the budget item of temporary heat was absorbed for more useful construction.

By September the school was almost finished and the students moved in. During the following months completion drew nearer as one grand opening after another was postponed for lack of such items as auditorium seats.

Administrative Cooperation

Superintendent of Schools Dana M. King must certainly be congratulated for his fine cooperation and tireless attention to the development of the program and construction. On his shoulders primarily rests its success. The principal of this new school, Homer P. Dearlove, is enjoying his new teaching facilities between proud showings of his school to visiting critics.

HOW TO ACHIEVE OUTSTANDING HIGH SCHOOL SCIENCE FACILITIES

by PAUL DeH. HURD

School of Education, Stanford University, Stanford, California

Dr. Hurd received his A.B. and M.A. degrees from the Colorado State College of Education and his doctorate from Stanford University. He taught science courses in high schools, junior college and college for 20 years. At Stanford University he teaches methods courses in science education. As a science education consultant, Dr. Hurd has participated widely in the planning of science facilities for both high schools and colleges. He is the author of *Science Facilities for the Modern High School*.

THERE are no "best" kinds of science facilities—there is just good planning. Good planning means translating the goals of science teaching first into learning activities and then into facilities which will help students to achieve the learning goals. Good facilities can exist only in reference to a particular school in a particular community with a special science program for a unique group of youngsters. These facilities become outstanding when they reflect a modern concept of science education, and when the architectural design functions in terms of this concept.

The development of good science facilities is a creative process. It begins when the teacher envisions the purposes of his courses. As these are formulated into teaching objectives, the educational specifications for the new facilities begin to take shape. Objectives represent "what-we-hope-to-accomplish" with students in a course. Good science facilities are not just "new," they should represent the best kind of education we can foresee.

A Good Learning Environment

Science facilities must inspire young people to learn. Outstanding facilities always denote a good learning environment. The arrangement of a room and its equipment should make possible the teaching techniques essential to the achievement of the specified objectives. These techniques represent all the methods and devices used by the teacher to help students realize the goals of science instruction. They may be expressed in terms of "how-we-expect-to-accomplish-the-job."

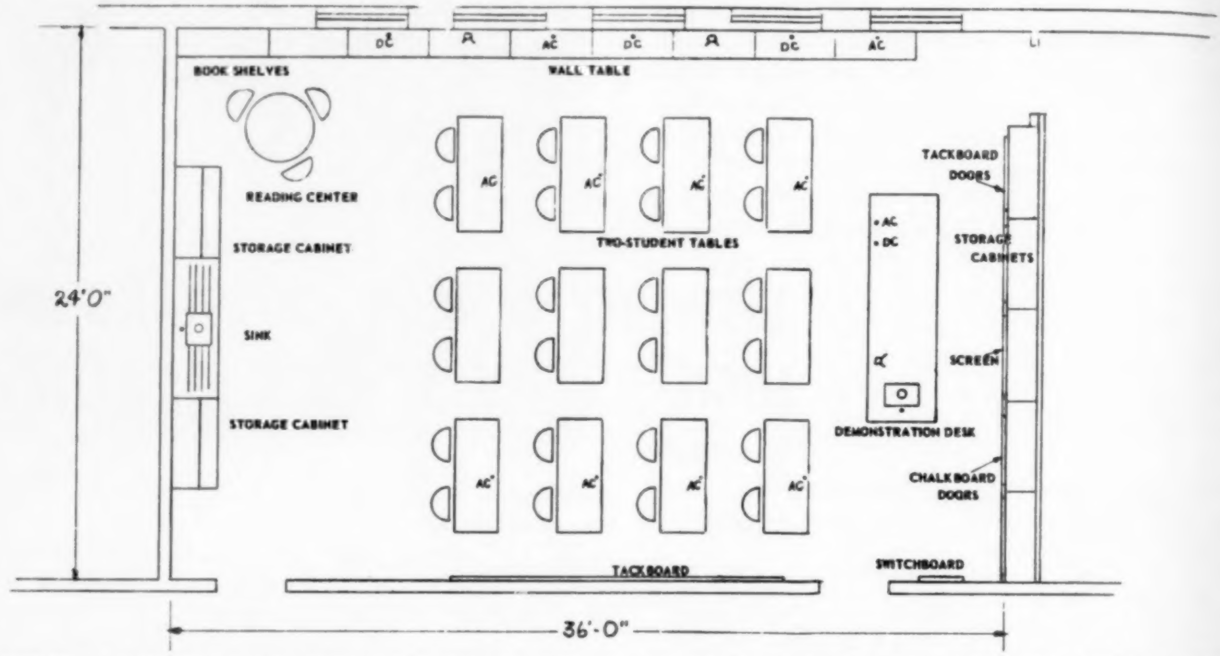
A New School Is Built to Last

Since a new school of today must last for many years, at least to the year 2000, this must be a consideration in the original planning. A first step is to examine critically the goals established for existing courses. Do they represent the most *recent* thinking and trends concerning the purpose of science teaching? Are they in accord with what is happening ***today*** in the world of scientific discovery and technology?

Modern educational specifications must be developed before one can hope to build a modern school. Planning in terms of the existing science curriculum and practices may be planning for a period of twenty or even thirty years behind the times. The resulting science facilities would be outdated the day of dedication, and only a monument to the past would have been created.

Planning for the future means several things; one is an evaluation of the existing science program to determine its educational status. Is the program abreast of the times? Is it operating somewhere near the frontier of current trends and the present thinking in regard to the direction science teaching should take?

Help in answering some of these questions may be obtained through (1) conferences with consultants in science education; (2) review of current educational re-

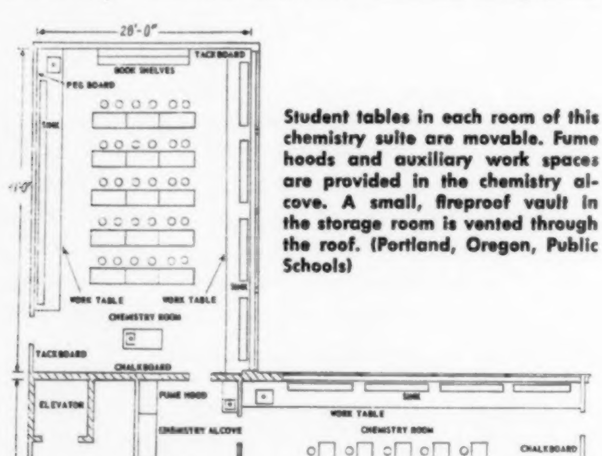


Flexibility is maintained in this classroom-laboratory for physics by placing all utilities except electricity on the wall tables and demonstration desk. Floor boxes with outlets should be sealed with protective caps when the table extensions are removed.

search; (3) study of the literature and reports of important committees on science education; (4) examination of "outstanding" courses of study; and (5) visits to schools reporting exceptional programs. The results from these efforts provide a basis for up-dating the present curriculum and teaching method where this seems necessary.

Science Changes Our Way of Life

Science courses in American secondary schools are in a state of flux with many new demands being made



Student tables in each room of this chemistry suite are movable. Fume hoods and auxiliary work spaces are provided in the chemistry alcove. A small, fireproof vault in the storage room is vented through the roof. (Portland, Oregon, Public Schools)

Plans by permission of The National Science Teachers Association, *School Facilities for Science Instruction.* Washington, D. C., 1954.

upon the curriculum. Several factors are responsible for this condition. One is the accelerated influence of science upon modern living. Science, through its methods, attitudes and achievements, has become the social catalyst of our time. It is identified with almost everything we call "modern." It is probably the strongest single determinant in our way of life. Its influence ramifies throughout our personal, social, political and economic life.

The new industrial revolution, characterized by atomic power and automation, gives promise of a new and exciting way of living. It also means that considerable experience with science, its methods, achievements and social influences, becomes imperative in the general education of every student. In turn, this will mean not only more facilities for science teaching, but courses of a different type. Their objectives will vary from those of the more traditional courses and they will be taught by other methods.

New Types of Science Courses

High school faculties throughout the country are devising and trying out many new types of science courses. A recent survey in California revealed a total of 22 commonly taught science courses in the public secondary schools, plus 189 additional types taught in one or more schools. A physical science course, drawing heavily upon physics, geology, astronomy and chemistry for its content, is growing in popularity throughout the country.

"Applied" science and "related" science courses are appearing more frequently in high school curricu-

lums. Earth science is having a rebirth in several sections of the country. A second biology course, of a more advanced nature, is becoming a frequent offering. The trend toward new and more kinds of science courses makes the planning of appropriate science facilities a challenge.

New Types of Facilities

Instructional facilities for science teaching are undergoing many changes. The trend toward the development of new courses combining content from several sciences has brought into existence the general purpose science room. This room contains provisions for both class and laboratory experiences.

The general purpose rooms are also adaptable for teaching a variety of content from many science fields. Commercial manufacturers of equipment have been quick to recognize this trend and have designed new lines of equipment and furnishings. Their newer catalogs list a complete line of equipment for the "total-experience," "all-purpose," "multi-use," "combination" and similarly described science rooms.

Established courses in the science curriculum, such as physics and ninth-grade general science, are undergoing changes in enrollment. According to a recent study on "The Teaching of Science in Public High Schools," by the United States Office of Education, about one-half of the high schools surveyed no longer teach a course in physics. And less than five percent of those students who enter high school elect a course in physics.

Trends in Course Selections

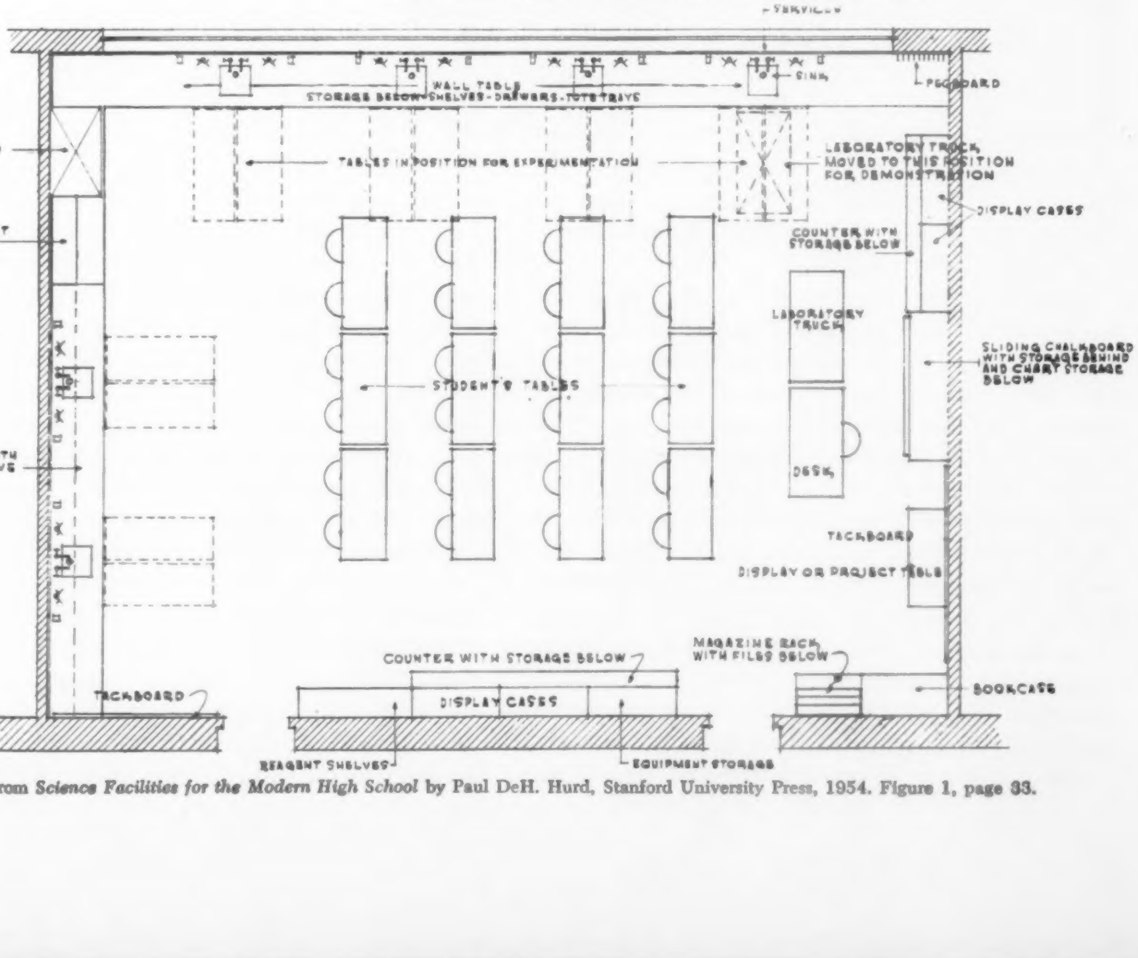
Ninth-grade general science must now divide its potential enrollment among safety, driver education, hygiene, conservation, orientation and similar subjects. Those who are responsible for developing science facilities cannot ignore these trends. Building for the future involves the creating of facilities so flexible that even major curriculum changes can be accommodated with a minimum of reconstruction and rehabilitation.

Outstanding science facilities must be more than appropriate for the existing curriculum; they must reflect an up-to-date curriculum and they must be easily adaptable to future changes.

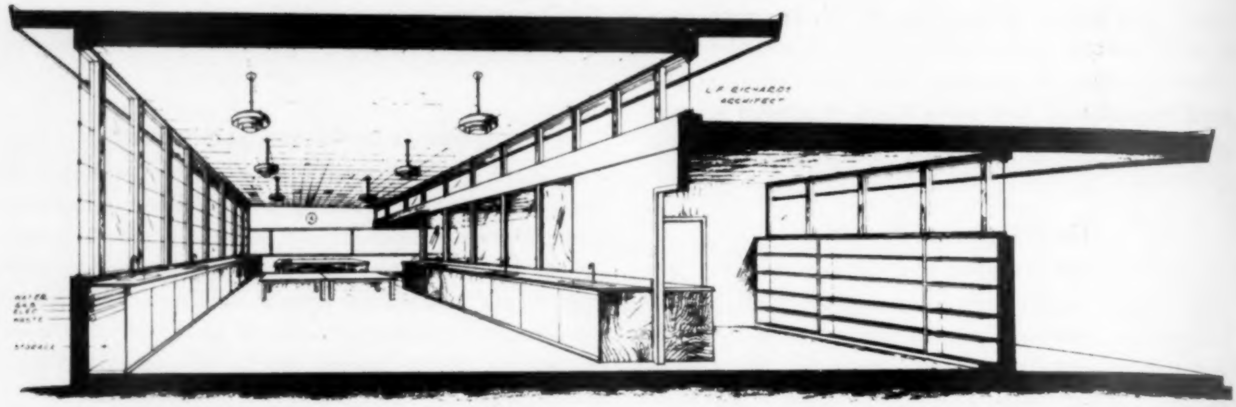
I. What Is a "Good" Science Program?

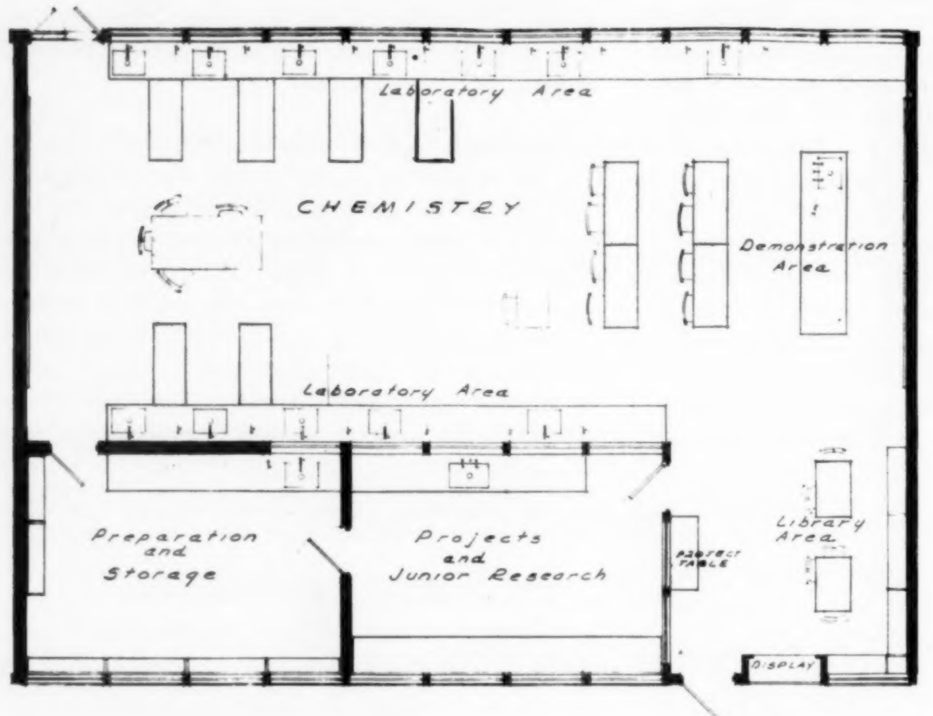
An outstanding science room is one that appropriately houses an outstanding science program. It is a room that makes possible the kinds of teaching techniques essential to a realization of the conceived program. Any attempt to evaluate the quality of facilities implies an evaluation of the instructional program itself. What is a good science program today? What kinds of teaching techniques characterize modern science teaching? The answers to these questions provide a

An all-purpose science room for the one-science room high school. This room combines a maximum of flexibility, economy and educational adaptability. A variety of work area is provided without the use of auxiliary rooms.



From *Science Facilities for the Modern High School* by Paul DeH. Hurd, Stanford University Press, 1954. Figure 1, page 33.





The chemistry room of the Gilroy High School, Gilroy, California, is illustrative of what can be achieved with a low budget and good planning. The school, designed by L. F. Richards, architect of Santa Clara, was built during 1956 at a cost of less than ten dollars per square foot, including the perimeter laboratory counters and storage cabinets throughout the room. A physics and a biology room of similar design, but each with special features, complete the science suite.

basis for saying "these are superior facilities for secondary school science teaching."

One of the major goals of science teaching is to develop within students those competencies associated with critical thinking. This also includes the ability to apply these methods, skills, techniques and attitudes to problems encountered in everyday living. To accomplish these results, students need to work and study in an environment which provides opportunities to rediscover for themselves the simpler and basic facts of science. This involves a laboratory situation where practice in the development and use of many problem-solving techniques is encouraged. Provisions are made for planning experiments, selecting techniques of experimentation, making accurate observations, helping to interpret data, followed by careful reporting and the application of findings to the problems under study.

Many of the learning activities in the science classroom consist of investigating, exploring, planning, validating, recording, trying-out, making judgments, appraising, organizing, correlating, evaluating, interpreting, applying, discovering, reporting, devising, cross-checking, defining, observing, demonstrating and experimenting. These teaching-learning procedures are carried on in terms of relevant subject matter essential to the development of new ideas, clearer concepts and functional understandings. These are the intellectual tools essential to the process of critical thinking for which instructional facilities must be provided.

Most of the student learning procedures in modern science teaching consist of "doing" activities. Learning science consists of studying problems not chapters, of investigating not memorizing, of interpreting data not repeating ready-made answers. Science facilities are outstanding to the extent that they support a wealth of discovery-type activities. When they provide students

with the opportunities to extend their learning beyond the resources of a single textbook they are beginning to create a research atmosphere.

To achieve these results varied investigating resources are required, such as reference books, current periodicals, models, charts and specimens; equipment for experimenting, recorders and projectors, essential to the use of data recorded on films and filmstrips; materials for the development of projects and visual displays; and tools for making special equipment. This type of science teaching implies a room of great flexibility.

More Demands Upon Facilities

The newer methods of teaching science make demands upon facilities that are different from those of the past. The emphasis upon discovery procedures requires that students have more freedom to work, to move about, to use at any time throughout the class period the resources needed to provide essential data. This means that the physical facilities must make it possible to shift from one learning activity to another quickly and efficiently. Older points of view held that class and laboratory work were two discrete aspects of learning, requiring separate facilities; this idea is not supported by any of the existing research on how different people learn.

Modern methods of teaching science are less formal and more permissive than in the past. The teacher guides and suggests and students are expected to explore, devise, plan, infer, discuss, compare and generally to do some thinking of their own. At the same time, it is recognized that the attack on some problems is more realistic and productive when utilizing cooperative efforts.

Today, most of the solutions to major problems in science as well as to those of community living are the result of people working together. These trends are reflected in modern science teaching. Through cooperative endeavors, students gain experience in being open-minded, in communicating ideas and in developing a deeper understanding of the similarity of the processes of science and those of democracy. Fixed desks, immovable tables and inflexible space adaptation are not conducive to this type of learning.

Different Learning Levels

The emphasis in modern science teaching upon the values to be developed through the student's own organized quest for knowledge poses certain problems in regard to instructional facilities. These arise from the recognition that not all students will be at the same stage in their endeavors at the same time; that not all students learn in the same way; and that not all students will use the same learning resources.

This can mean that not every student will be required to do the same laboratory experiment in the same way on the same day. It may be desirable to develop with every student a common understanding of the same principles of science. Such progress with every student, however, will not be guaranteed by a requirement that all students read the same assignment in an identical text on the same day.

To accommodate a teaching program which recognizes that not all youngsters are alike requires facilities that provide for many types of learning activities; that accommodate a wealth of resource materials, and that permit the teacher to work easily with each student needing help and guidance.

Opportunities for the Gifted

Special opportunities for the gifted students in science should be reflected in the physical facilities. This means a work area where these students may carry on junior research—a place where experiments or projects in the process of development can be worked upon during spare hours, and where equipment may be left "set-up" for even months at a time. Since the hope is to challenge these students to a greater than average extent, different, more specialized and more precise equipment will be needed for them.

Gifted students, if their abilities are to be developed, must have the physical facilities which will accommodate their typically wide interests, and the equipment to stimulate them in the direction of creative activities. They must also work in an environment where they can challenge each other. Learning activities of this nature suggest a special work area separate from the regular classroom facilities.

One function of the high school science program is to discover and develop those students who can profit from a college education. In the past many of those who planned science rooms have thought that the best way to accomplish this objective was to duplicate college teaching facilities in the high school. As a result, separate laboratory and lecture rooms were designed for the high school. Overly equipped and expensive laboratory tables distinguished one room, and desks securely fastened to the floor and facing a mammoth demonstration table characterized the other room. Teaching methods were in accord with the facilities.

Preparation for College

Recent trends in science teaching suggest that the skills, abilities and attitudes which serve as preparation for college differ only in degree and quality from those essential for effective living. The high school prepares students for college science by developing in them an intense interest in science, an appreciation of the importance of science in their society, and a sensitized curiosity vitalized through many explanatory and discovery activities in high school.

These students understand the method of science and recognize it as one of the greatest inventions of mankind. They can use many of the simpler tools of science, and have a knowledge of experimental techniques developed through independent investigation. They are able to read science materials intelligently and can organize, interpret and represent data accurately.

In addition, these students have developed an understanding of some of the major principles of science, are able to apply them to problems in their immediate environment and to use them as bases for attacking new problems. They have had much practice in thinking critically about a variety of problems. Training of this kind, as preparation for college, requires a science room which is identifiable as a highly flexible learning laboratory.

II. Flexibility—How Facilities Are Made Flexible

The architect, in planning new science facilities, begins with a set of educational specifications representing the best thinking of the science teaching staff. He must then develop these specifications into a physical environment which will be able to function within the economic limits of the community. At the same time, he must provide facilities flexible enough to encourage and to accommodate the continual development of new science courses, to permit improved techniques in teaching and to adapt to the future educational needs of the community.

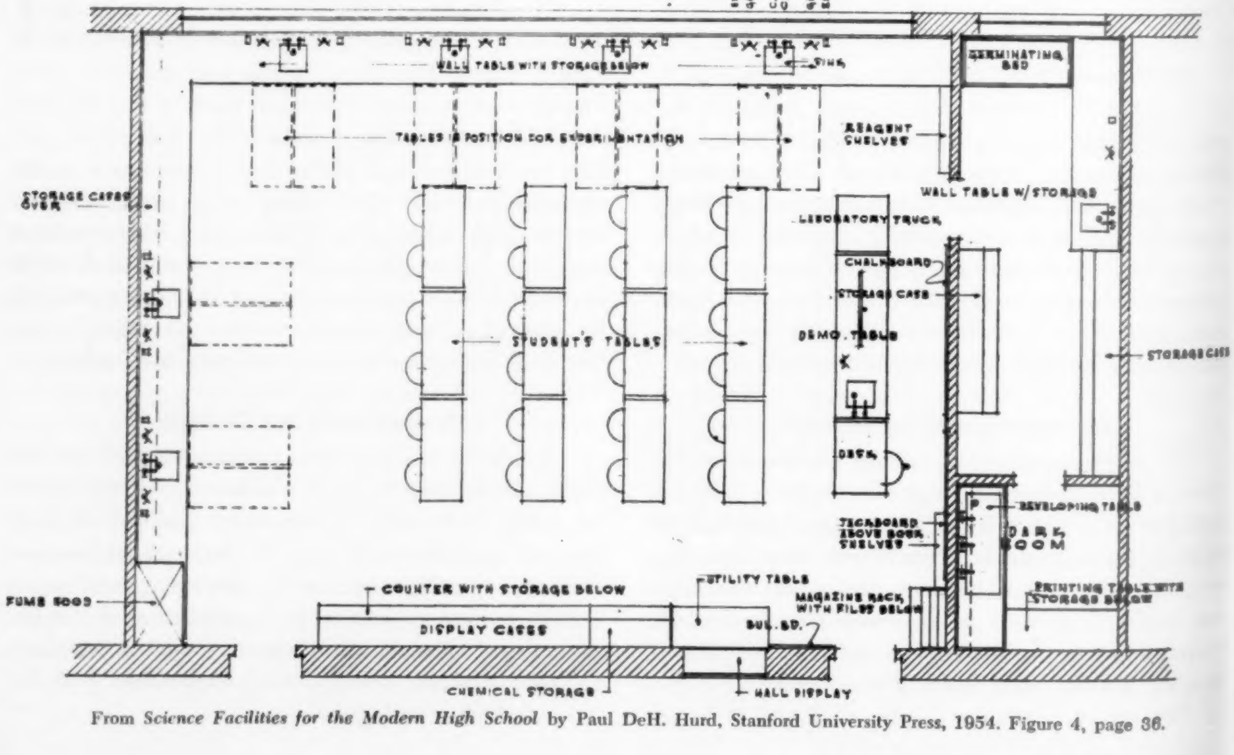
The rigid, formal and immovable science facilities of the past are no longer appropriate for present day science teaching. These traditional rooms came into existence at a time when the concept of formal discipline was pre-eminent. Since class and laboratory work each had its own disciplinary values it seemed best to assign the development of these values to separate rooms and even to specified days of the week. The sharp distinction between class learning (characterized by a textbook) and laboratory learning (characterized by a notebook and manual) with specialized facilities for each is in sharp contradiction to the concepts of science teaching today.

Modern practices in science teaching suggest that a single room of great flexibility is the most appropriate for achieving the results desired. Outstanding science facilities would be characterized as learning areas with a high degree of adjustable and adaptable working space. This is imperative in order to accommodate a science curriculum that is more fluid today than at any time within the past twenty years.

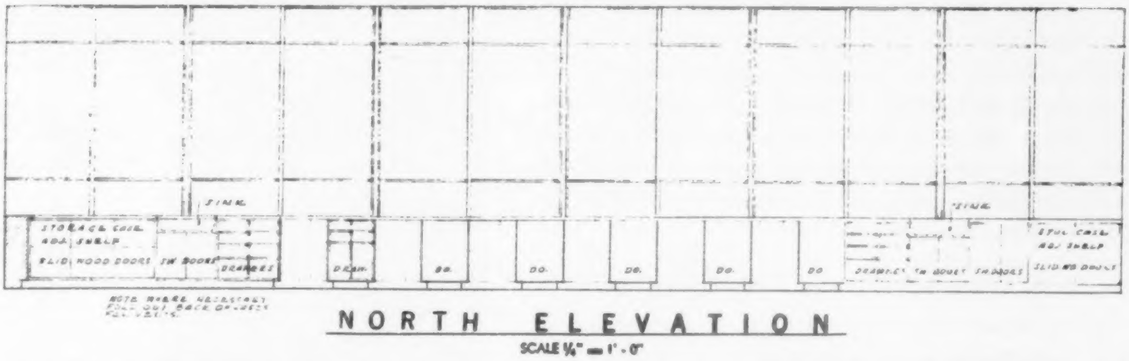
Increasing enrollments, both in the number of adolescents and in the percent of the total group entering high school, have already activated curriculum changes. All of these developments indicate the need to keep facilities flexible in order to prevent the freezing of any program into the curriculum through the inappropriate use of steel, concrete and bolts.

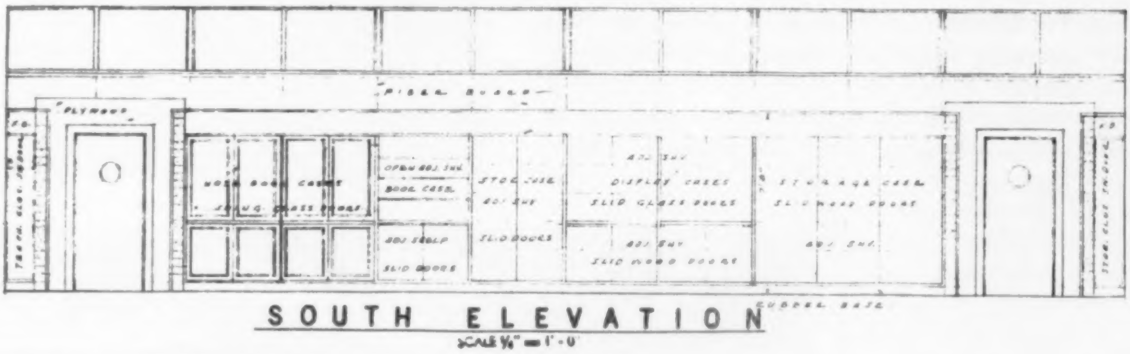
A science room, to be outstanding, must embody

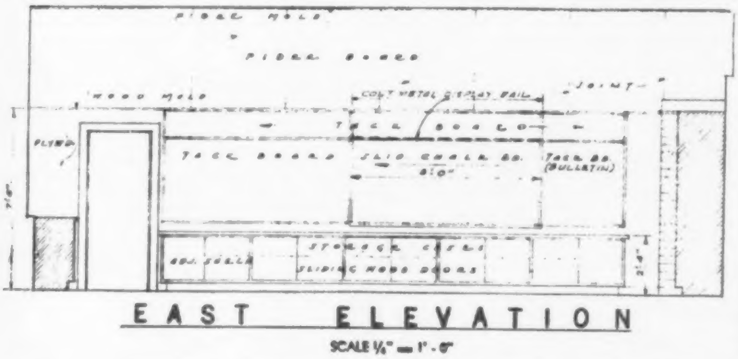
This all-purpose science room has auxiliary rooms which help to increase the functions served. The laboratory work area, in which utilities are required, is available to more than half of the class without having to move tables. Storage spaces are well distributed.

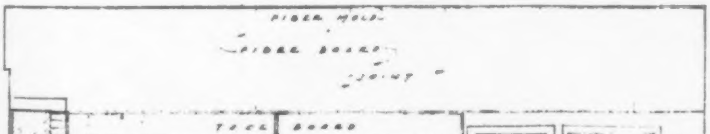


From *Science Facilities for the Modern High School* by Paul DeH. Hurd, Stanford University Press, 1954. Figure 4, page 36.









Elevations of the biology room in the Menlo-Atherton High School, Atherton, California, show the complete use of all available wall space to support the teaching-learning program. Storage facilities are conveniently distributed around the four sides of the room; there is no separate storeroom. Display space is available on each side of the room. The architects are Arthur D. Janssen and William H. Daseking of Atherton.

a maximum of flexibility. While flexibility has a number of meanings, both architecturally and educationally, it is within the realm of the following questions that the areas of greatest concern can be identified:

Is the room flexible enough to provide for the many kinds of learning activities essential in modern science instruction? This means, among other things:

1. Desirable learning activities are not restricted or inhibited in any way by the physical environment.
2. The learning environment makes it possible for many activities, related to the gathering and verification of data, to be carried on at the same time.
3. Group problem solving activities are not restricted by immovable or unwieldy furniture. Individual and group arrangements are possible within the classroom at the same time.
4. Many learning resources are conveniently located

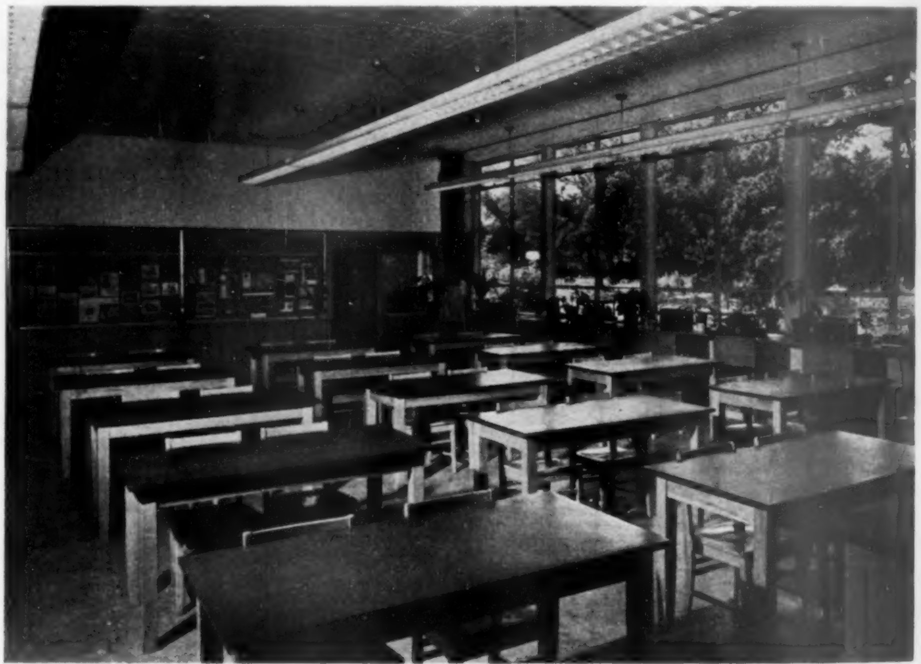
within the classroom, such as reference books, current materials, magazines, models, charts, specimens and commonly used equipment.

5. Auxiliary facilities in terms of segregated work areas are available for students with special interests and skills. These areas should provide facilities for long-term experiments and for the preparation of projects.

Is the room instructionally flexible? This means:

1. Students can quickly shift from class to laboratory activities within a single room.
2. Teachers can move easily throughout the room providing help and guidance to individual students.
3. Students can move, with a minimum of disturbance, from one work area within the room to another.

7. Doors and aisles will accommodate mobile laboratory tables which can be outfitted in a preparation room and moved into the classroom ready for instant use.
8. The teacher is able to provide general supervision from any position in the room. Turret mounting of utilities on island tables, and long narrow rooms are avoided.
9. Provisions have been made for students to present visually their ideas and projects through the availability of various types of display areas, such as project tables, demonstration units, hall and class display cabinets and various wall display units including pinning, tack, chalk, magnetic and peg boards.
10. Each student is provided with a work area sufficiently large to accommodate books, reference materials, equipment and other learning materials



The biology room of the Menlo-Atherton High School is designed for a wide variety of teaching and learning activities. The room is located on the north side of the building. Draw drapes at the windows darken the room when necessary, and are set well away from the laboratory work area. There is a project room at the rear of the classroom.

Photos by Keith Cole Studios

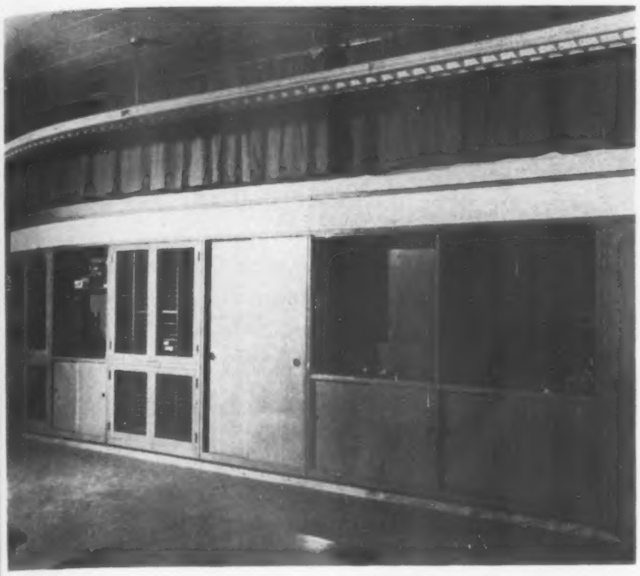
4. Demonstration areas are available at different places within the room—several setups can be used at the same time.
5. The facilities have been developed primarily in terms of local course objectives and therefore present fewer obstacles to effective use.
6. Laboratory facilities, projection machines, construction materials, library resources and other teaching devices (books, laboratory equipment, aquariums, models, charts, tape recordings, films, filmstrips, television) are properly located in the special work areas. As a result they function with a minimum of effort on the part of the student and teacher; the room is self-sufficient in teaching resources.

needed at one time. This suggests the value of tables rather than armchairs for science instruction. The tables should be a type that makes it possible for all students to face in one direction when this is desirable.

Is the Room Architecturally Flexible?

Is the room architecturally flexible? This means:

1. Non-load bearing walls wherever possible. Work areas requiring separation should be shielded by functional partitions rather than permanent walls.
2. Repetitive modular construction with each module containing provisions for natural and artificial light, temperature and ventilation controls.
3. A minimum of dividing walls between work areas,



Display facilities are distributed throughout the biology room of the new high school in Atherton, California. There is a strip of tackboard above the cabinets. Janssen and Daseking, architects.

such as preparation, storage, darkroom, office, growing and project rooms.

4. An emphasis upon special work areas rather than special rooms.
5. Storage areas dispersed throughout the rooms and planned in terms of convenience and accessibility.
6. Non-specialized storage facilities beyond the minimum requirements of safety and the protection of delicate equipment.
7. Expansion of facilities planned at the time of original construction.
8. Utilities and waste lines arranged so that it is a simple procedure for them to be tapped.
9. Space adjustments facilitated; movable and, to some extent, interchangeable laboratory tables, storage units, bookcases and display units; fixed equipment located near walls so that the major area of the room space can be quickly reorganized.

Is the Furniture Flexible?

Is the furniture of the room flexible? Does it provide the following accommodations:

1. A minimum of fixed furniture such as, island laboratory tables and other stationary equipment.
2. A room equipped with movable tables so that group work and other special arrangements are possible.
3. Multi-purpose student tables serving for both class and laboratory work.
4. Modular furniture or basic units making it possible to provide arrangements suitable to the demands of new teaching methods.
5. Room furnishings adaptable to all teaching.

III. Economy—Facilities Can Be Economical

Economy means providing the best type of science facilities conducive to the best type of learning which the community can afford and support. The progressive rise in building and maintenance costs, the expanding secondary school teaching program and increasing enrollments make economy an important issue in the planning of special areas. All too frequently economy in school construction results in an uneconomical educational program.

A more realistic attitude is one that recognizes the time has now arrived to re-examine and re-evaluate the science program. The faculty then asserts its combined creative abilities to devise new and more efficient ways of doing the things which they have always thought were better to do. Economy is not a matter of leaving out something, but is a question of better design, flexibility and careful educational planning. In school planning, more physical and educational economies have been sacrificed through maintaining traditions than through the modernization of teaching methods and facilities.

Where to Effect Economies

An evaluation of outstanding science facilities must consider the degree to which learning efficiency can be maintained within the economic limits of the supporting community. Many of the characteristics essential to flexibility also mean a maximum level of economy. Answers to the following questions suggest areas in which economies may be expected.

Has the selection of furniture been the most economical in terms of purchase cost, durability, maintenance and flexibility? Does the furniture meet the following requirements:

1. Two and three-place student tables to serve both class and laboratory functions.
2. A maximum of uniform units from one science room to another.
3. Standard components rather than custom items.
4. Simpler worktables, with a minimum of drawers, sinks, utilities and other built-in features.
5. Furnishings which are easy to install and to maintain.
6. Furnishings which are planned with the building so that the total capacity of the room can be made useful. The use of old furniture in a new building is seldom economical either in cost or in educational suitability.

Have the room furnishings and other facilities been selected with a consideration for maximum usage, storage, display and work space? This means, among other things:

1. Storage walls are used as partitions.

2. Class and laboratory tables are the same unit; any additional work space is provided through the use of wall counters.
3. Room cases are adapted for display at eye level with storage areas above and below.
4. Chemistry hoods are designed and located so they may serve as a class demonstration area as well as a locked and vented storage area for dangerous chemicals. If the hood is equipped with utilities it can serve as a work station for two or more students.
5. The teacher demonstration table is also planned for student stations accommodating four to six students for individual laboratory work.
6. The number of auxiliary rooms is kept to a minimum and then designed to serve a double purpose, such as combination storage and preparation rooms, combination photographic dark and preview rooms, and similar combinations that may be feasible. With only minor losses for instructional resources, science rooms can be planned to eliminate all auxiliary rooms.
7. Ample tack, peg and chalkboards are provided so that the walls may be used as a teaching facility.
8. Special cabinets with fixed spaces for storage are eliminated in favor of larger drawers and adjustable shelves.
9. Each set of utility services is planned to accommodate several student stations. All laboratory tables within a room are not provided with the same services.

Has the room been arranged so that the majority of work areas will be in use most of the time? This means:

1. Class and laboratory activities are carried on in the same room. Rooms of this type are described as "all-purpose," "combination," "total-experience," "self-contained" or "multi-use" rooms.
2. One student station per student is obtained through the use of combination worktables and one chair per student.
3. Common auxiliary rooms, such as storerooms and preparation rooms, are planned for science suites.
4. Laboratory carts and a preparation room are provided so that the classroom does not have to remain idle while another teacher "sets up" demonstrations or organizes laboratory equipment.
5. Each science room is designed to accommodate the teaching of several sciences.

Have facilities been selected which can be economically expanded if the demand arises? Economical expansion can be effected by:

1. Using a modular repetitive design, non-load bearing partitions, free-standing cabinets, standard furnishings and free-moving laboratory tables.
2. Installing utility lines accessible in trenches or exposed along wall surfaces, making it unnecessary to disturb walls or floors in expansion.
3. Planning all science rooms as multi-science rooms, rather than as specialized rooms.
4. Planning for the expansion of the science facilities at the time of original construction by selecting the rooms that can be easily adapted and then roughing in basic utilities.
5. Providing enough storage area to accommodate the trend toward the use of classrooms for instructional purposes from ten to sixteen hours per day.

Has the room been designed for economy, ease and convenience in supervision and teaching? This includes the following arrangements:

1. Student equipment and supplies are stored near the point of usage; this requires a maximum of room storage and results in a minimum of traffic.
2. Commonly used demonstration apparatus and supplies are stored in or near the demonstration table.
3. Audio-visual facilities are located within each room and include pull-down projection screens, permanently mounted speakers, darkening devices and conveniently located light switches.
4. Vision strips for ease of supervision are placed in walls which separate student work areas, such as a project area, from the regular classroom.
5. The room is sized and arranged for a maximum of individual attention for a given number of students; this number is typically less than thirty.
6. All worktables can be arranged so that students may face in one direction for special work and demonstrations.
7. A perimeter arrangement of laboratory work stations is provided for an unrestricted supervision of the class from any point.
8. A preparation room is provided when two or more teachers are to use the same room during the day.

What Can Be Achieved

Where outstanding science facilities have been achieved in secondary schools, one common characteristic may be noted. All of them reflect a common point of view on secondary science instruction—the concept that science teaching-learning processes demand a variety of learning activities, most of which are associated with discovery activities. Excellent results of flexibility and economy *can* be achieved, and without the sacrifice of educational suitability.

The student commons of the Ramapo Regional High School for Oakland, Franklin Lakes and Wyckoff, New Jersey, is centrally located and adjoins the library. The architects of the school are Sherwood, Mills and Smith of Stamford, Connecticut.

THE HIGH SCHOOL WITH A STUDENT COMMONS CORE

by THORNE SHERWOOD

Partner, Sherwood, Mills and Smith, Architects, Stamford, Connecticut

Mr. Sherwood has a B.A. degree from Williams College and a B.Arch. degree from Columbia University. He held the Perkins-Boring Traveling Fellowship and a Columbia University Fellowship. Mr. Sherwood has been a practicing architect since 1942.

Bachrach

THREE important factors influenced the design of the Ramapo Regional High School in Franklin Lakes, New Jersey: the character of the site; the desire for high quality at moderate cost; and the belief that learning and living should proceed side by side.

The Site

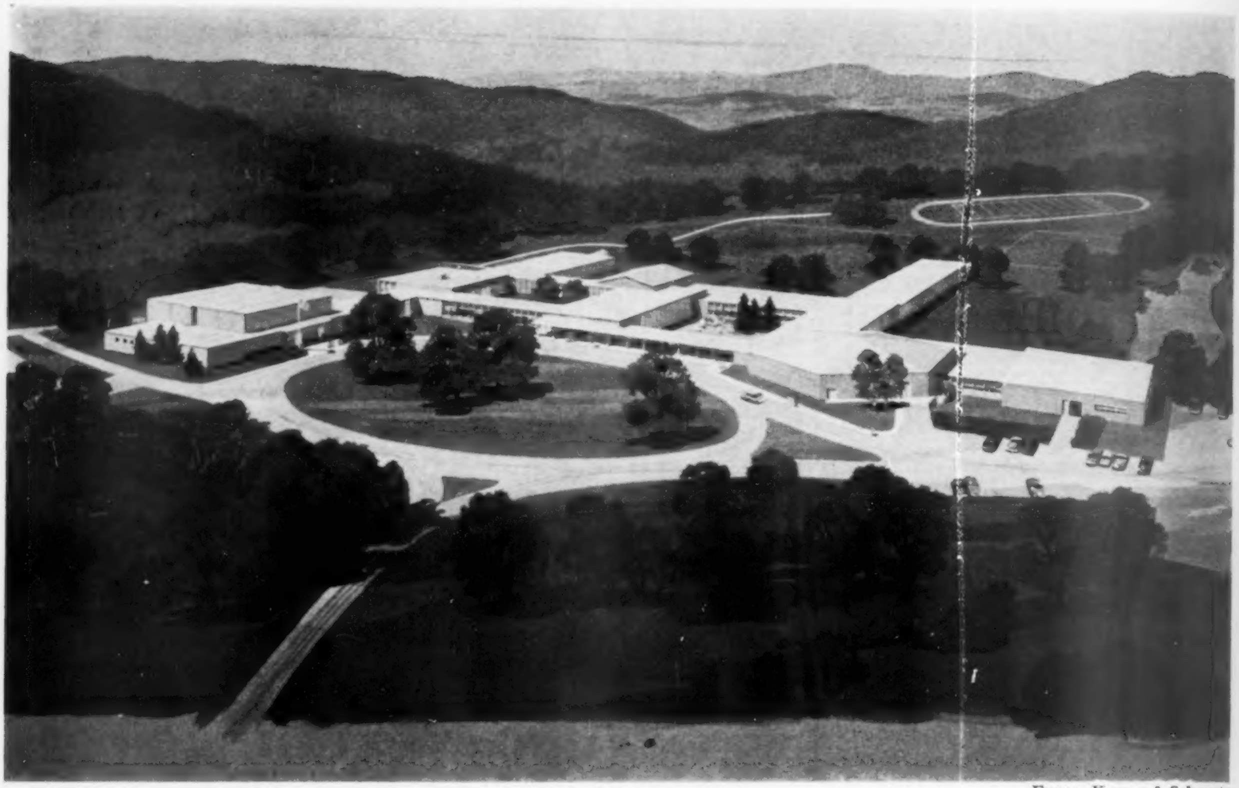
The site is a magnificent one, rural in character and comprising about 50 acres of unspoiled country, with a distant view of the New York skyline and the small mountains of the Ramapo range in the foreground. We determined to keep the native planting of dogwood, oaks and simple growth, rather than develop the site in a formal manner.

The school was located at the north end of the property for safe and minimum approach from residential George Street, leaving the maximum amount of land free for recreation and outdoor study as well as for the excellent southern view. The plan follows the existing drops in the terrain to minimize the expenses of cut and fill over the site. Advantage is taken of an abrupt drop in land on the east side for the boiler room location.

Quality at Moderate Cost

Quality is an overworked word, used freely in television programs, Victorian novels or the advertising pages of current magazines. It is applied glibly and unceasingly to describe everything from beer to bicycles.

In schools, the term quality is often synonymous with cost. It may mean more expensive materials, elaborate (and sometimes unnecessary) facilities or costly construction methods. Many a school board has discovered too late that high costs do not necessarily guarantee a top quality school. Many a burdened taxpayer has discovered this also.



Furna, Kempa & Schwartz

Ramapo Regional High School is situated on a site of 50 acres of rural countryside. The building is located at the north end of the site and a maximum amount of land is available for physical education purposes, recreation, outdoor study and parking areas. Much of the native growth is untouched by any formal landscaping.

What, then, determines whether or not a school is a quality school? The most important factors in a well designed school do not always meet the eye as readily as the determination of adequate lighting or a pleasing landscape. It goes beyond such obvious factors as the location of the principal's office in relation to the entrance, the acoustics in the auditorium and provision for the unloading of buses. What *are* the most significant factors in the design of a good school?

Perhaps the most important consideration is whether or not the building fulfills the needs of everyone who will use it, not only when it is first constructed, but in years to come. These needs are not just physical in character—there are emotional and social needs, too, especially where teen-age high school students are concerned. Are there good athletic facilities placed in an area where they may be enjoyed fully without the problem of disturbing others? Are the colors throughout the building cheerful and gay, so that pupils and teachers feel stimulated and enriched by their surroundings? Are there provisions made for the leisure time activities of pupils and teachers, and for the role of the student as a future citizen and homemaker?

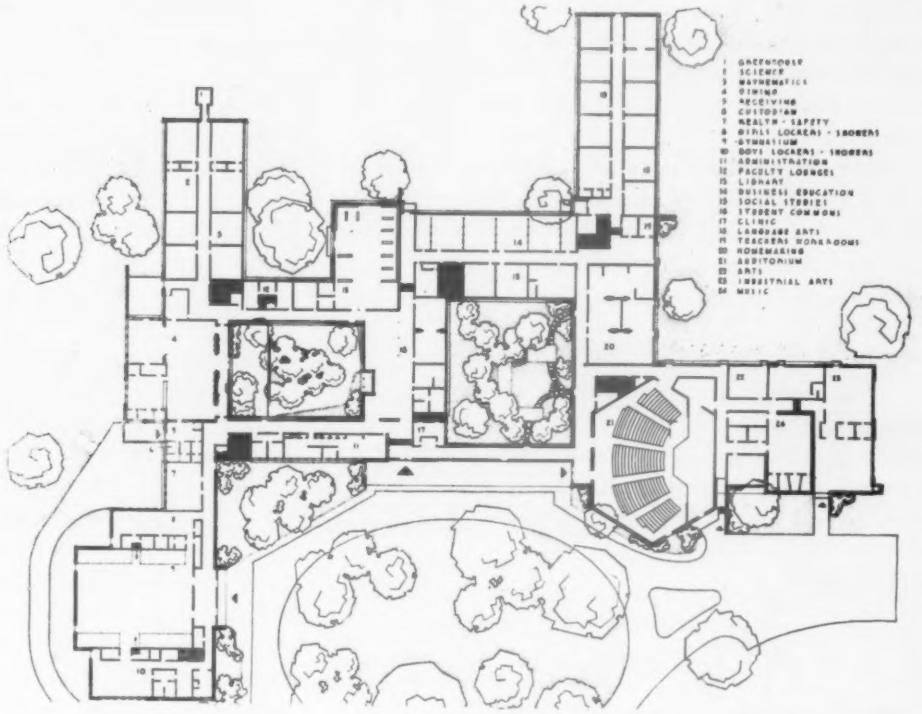
But the school has another job, too. Usually it is a meeting place for the community—it will be needed for PTA meetings, dramatic and musical programs, assemblies, adult education. In other words, to fulfill its function it must be used not only as an academic institution, but as a home center, a springboard for citizenship and a community house for the student and adult population.

Living While Learning

The third consideration which influenced our design in the Ramapo High School, that learning and living should proceed side by side, had perhaps the most far-reaching effect upon the final plan.

Mr. Elmer Knoeller and Mr. James Heath, former and present presidents of the Ramapo Regional Board of Education, Mr. Edmund Van Houten, chairman of the building committee, and Mr. David Ross, principal, together with active and interested board members and our educational consultant, Dr. Walter D. Cocking, met with us for many long hours, sifting through the ideas that produced the final design with the student commons as the core of the high school.

We all had had the same feeling that valuable space was being wasted, whenever we passed a school building when classes were not in session. We all had seen the empty and desolate building, the lifeless grounds (except for an occasional lone boy tossing a ball into a basket). On the other hand, we had read of adult dramatic and discussion groups meeting in cramped quarters, of the problems of adolescents with



The gymnasium and auditorium are available for community use and may be entered without requiring access to the remainder of the school.

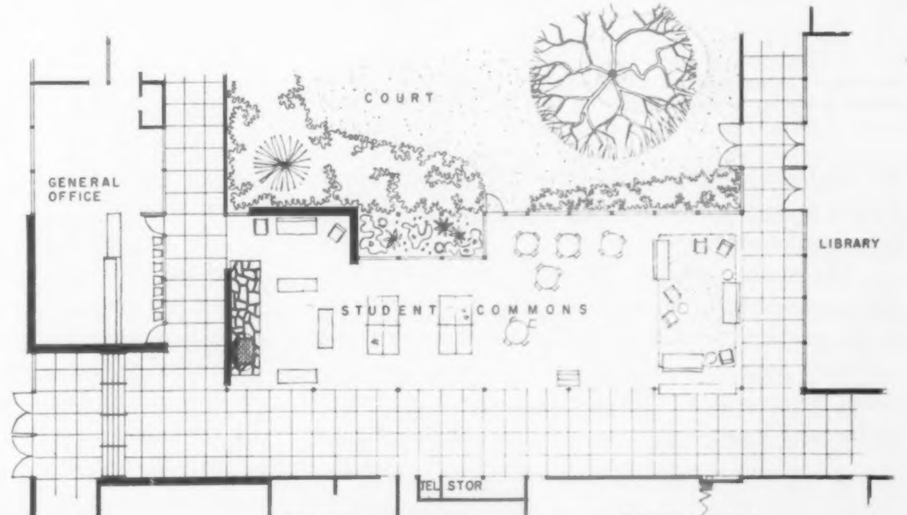
no place to go except the local beer halls. The Ramapo committee wanted to have their school used as much as was practical.

A Building for All to Use

Why not combine the needs of all groups and design a building for everyone who would use it, seven days a week if necessary? If boy and girl scout meetings, for instance, or teen-age recreational programs (ping pong, square dancing, discussion groups) could take place in a student living room, supervised outside of school hours by responsible adult members of the community (scout leaders, recreation officials, etc.), the burden would not fall heavily upon the free time of teachers and school administrators in the system.

In the Ramapo school, the commons room is located centrally and constitutes the heart of the school, physically, academically and socially. It is next to the library, so we see citizenship and social life tied to learning rather than learning divorced from the activities of youth. The student may select a book and take it into the adjoining room to read during a free period. The room may be used by the librarian for stimulating discussion groups, book reviews and projects without disturbing other students in the library. Here, source material is immediately available.

The lounge will be furnished in a sturdy but homelike manner, with gay colors, comfortable and easily



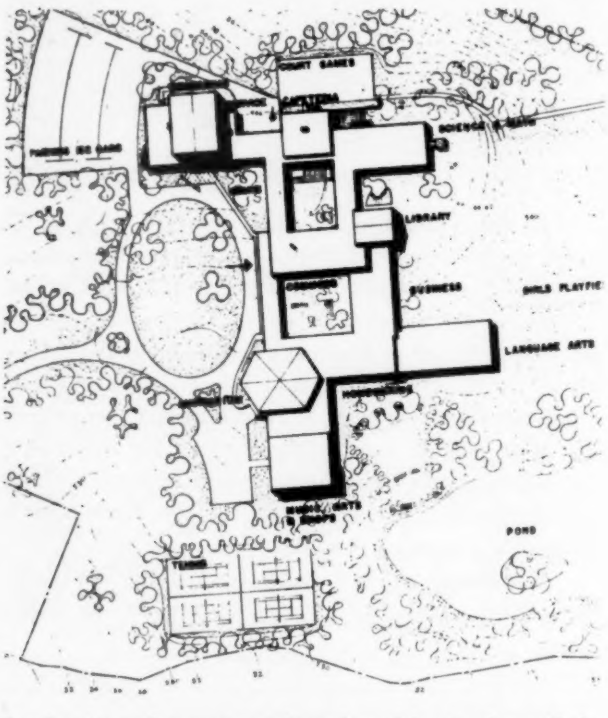
The student commons adjoins an interior court and window walls afford a view of the outdoor area.

moved furniture, good lighting. One side of the room opens onto a grassy court, cool and inviting in warm weather, which forms a warm sun pocket on cold winter days. This court is really an extension of the room itself.

Opening off the lounge are a guidance center, a student activities room (where the weekly paper is published) and a flexible multi-purpose area for overflow class work and student meetings. From these rooms a corridor extends to other parts of the building.

A Many-Purpose Lounge

The possible uses of the student lounge are innumerable. Its location enables it to serve as an adjunct to the library, guidance center and student activities room. It may be used as a hospitality center because of its accessibility to kitchen facilities. Most of all, it



Two interior garden courts are the nucleus of the site plan, with the student commons located between to form the core of the school.

can provide a homelike social center for the high school student in an atmosphere which we hope he will find to be comfortable and attractive.

The study areas or classrooms are grouped together according to their general classification. For example, mathematics and science occupy their own wing and have their own display areas. Business and education are together. Likewise languages, arts, social studies and home economics are grouped together informally, always with a pleasant view to the mountains at the south, or into the intimate landscaped courts.

The garden courts form an extension of many activities, including the display of student work and social gatherings, and are short cuts to other areas of the building. They are also a useful device for giving a large institution an informal and varied aspect. The cafeteria takes advantage of both views, which are extensive, and faces directly onto a paved area in one garden court. The auditorium lobby, which is actually a gathering place for students between various elements of the plan, is also used as an exhibit center, and extends into one of the garden courts. Fine arts and industrial arts are grouped near or adjacent to the stage of the auditorium for practical reasons.

Public Use of the Building

It was important to find a way to handle large public crowds efficiently for auditorium and gymnasium uses and to provide a way to keep unauthorized crowds out of the rest of the building. Large gatherings of people, attending a function in the auditorium or gymnasium, would have access only to one or the other of these elements or the two in conjunction, plus the cafeteria for certain functions.

There are parallel means of access to every part of the building made possible by the garden courts, an important factor when you consider that over 1,000 young people are moving from one work or study center to another. This is an effective way to prevent unpleasant crowding and to reduce the institutional aspect of a school of this size. At the end of any long corridor where crowding may occur, careful attention has been given to providing an open area so that bottlenecks can be eliminated.

The Student Is the Module

The module or unit of measurement throughout the building is the student. We tried to consider him in terms of his needs, physical, social, academic and emotional. We wanted to surround him with a variety of beautiful materials, honestly used, an informal plan, interesting vistas from all areas of the building and, at the same time, give him a practical, workable place in which to grow.

By providing him with a social gathering place which he could use during and after school hours we hoped that he would come, in time, to think of it as more than a gathering place, as an intellectual center, a hospitality center, with himself in the role of the homemaker, and as a depot for his life as a citizen in the community.

Hube Henry, Hedrich-Blessing

The lobby of the Community High School in North Chicago, Illinois, is also the lobby of the library. Display cases feature some of the many books to be found in the library. Architect of the school is the Warren S. Holmes Company of Lansing, Michigan.

A HIGH SCHOOL LIBRARY DESIGNED FOR YOUTH

by MARIE GORMAN

Librarian, Community High School, North Chicago, Illinois

Marie Gorman received a bachelor's degree from Illinois State Normal University and a master's degree from the University of Illinois. She has been a librarian in various schools in Illinois, both elementary and secondary, for nine years. North Chicago High School is the third new library which Miss Gorman has organized.

and WILLIAM E. HERBSTER

Superintendent of Schools, North Chicago, Illinois

William E. Herbster has been superintendent of the North Chicago High School from the time the district was organized. He has a bachelor's degree from Illinois State Normal University and a master's degree from Northwestern University. Mr. Herbster has been a teacher and school administrator in the state of Illinois for twenty years.

IT is not the easiest task to design a library for young people. Youth today, as in days gone by, is a time of passing fancies and changing fads. So our library designs must include features that will prove themselves to be pleasing, functional and adaptable to the restless needs of high school students.

The library at the Community High School in North Chicago, Illinois, designed by Warren S. Holmes Company, Architects, Lansing, Michigan, is pleasing to youth in many different ways. Perhaps the foremost aspect is that it was designed to be inviting. The lobby area helps to illustrate this point. In front of the library are two display cases; one is shallow with a corkboard back, while the large case has glass on two sides and is equipped with three glass shelves. Since the library has a central location, every student in school passes this lobby several times a day and the contents of the display cases attract sizable audiences.

The lobby entrance is a most desirable feature. The library, like any other department of the school, thrives on publicity. Several times during the week announcements will be made over the public address system, referring to meetings or gatherings "in the lobby in front of the library." The glass doors and windows keep the noise in the lobby, but the warm, friendly library room and the attractive displays often draw the students into the library after the meeting is over.

Youth is not overwhelmed by rows and rows of books in the North Chicago High School library. The non-fiction books are arranged in sections divided by shelves, and a table has been placed in each section. It is a simple matter to label books when they are sepa-

The charging desk of the library is in the center of the room. The card catalog is close by. The room is 68 feet long and 34 feet wide. There is ample seating for 70 students and shelving space for 10,000 volumes.

rated in this manner. The tops of the shelves can be used for displays, illustrating the types of books to be found below. The Dewey Decimal System becomes a friend instead of an enemy when physical conditions help to explain the divisions.

The Effect of Color

Color, too, plays an important role in helping to make a room pleasing to youth. In this library the floor, shelves and furniture are shades of grey and beige. The brick is a warm brown-red, the same tone being repeated in the drapery. The upholstered chairs are deep red, light brown and, for a contrast, two are turquoise blue. The foliage in the planters not only adds color but also provides a live growing note when snow and bare trees of the winter landscape are seen outside the windows.

The windows face south and are protected from the glare of too much natural light by the drapes and by a generous overhang of the roof. On dark days artificial light provides illumination without shadows.

Young people are not always aware of all the various details or the careful planning that constitute the creation of a good library. They only know that their library is an inviting room, one to enter at every opportunity.

Planned for Function, Too

On the other hand, for youth and for the welfare of the school, a library must also be functional. The library of the North Chicago Community High School will hold 10,000 volumes and seats seventy students. The length is sixty-eight feet and the width of the room is thirty-four feet. Since the school was planned for a capacity of 1,200, space requirements are adequate and more tables and chairs can be added as needed.

The charging desk is in the center of the room, close to the card catalog, the reference section and the

librarian's office. A book return slot in the desk insures that no book will be taken out unless it is properly signed. The low shelves in the reference section between the desk and the librarian's office make it easy for any small freshman or senior to use the heavy volumes.

The librarian's office is enclosed by glass. The librarian can view every occupant of the room from the office. At the same time, because visibility is unencumbered, the librarian is in full view of each student who is looking for help.

Workroom and Conference Area

The workroom is entered through the librarian's office and is separated from it by glass windows. By this means the librarian can supervise the students while they work on new books.

A purposeful feature of the library conference room is that it can be used as one large room or can be converted into two rooms by means of a folding door. Glass panels in the doors and at the sides permit supervision of the area. The conference rooms are not soundproof, but it is possible for students using them to talk in low quiet voices without disturbing the students in the library.

Beyond the library is the study hall. Students at North Chicago are allowed to come to the library as soon as attendance rolls have been checked in the study hall. If a class is using the library, the number of students from the study hall is limited. Teachers may also send students from classes to the library.

The function of a library is to provide service to the students and faculty in such a manner that this service will be prompt, reliable and cheerful. In the design of the library at the high school in North Chicago, every effort was made to insure service of this caliber.

Since youths are changelings, their library must be adaptable to differing personalities and circumstances. In selecting the books, care is taken to choose volumes with reading levels to accommodate the whole school population.

Room for Audio-Visual Aids

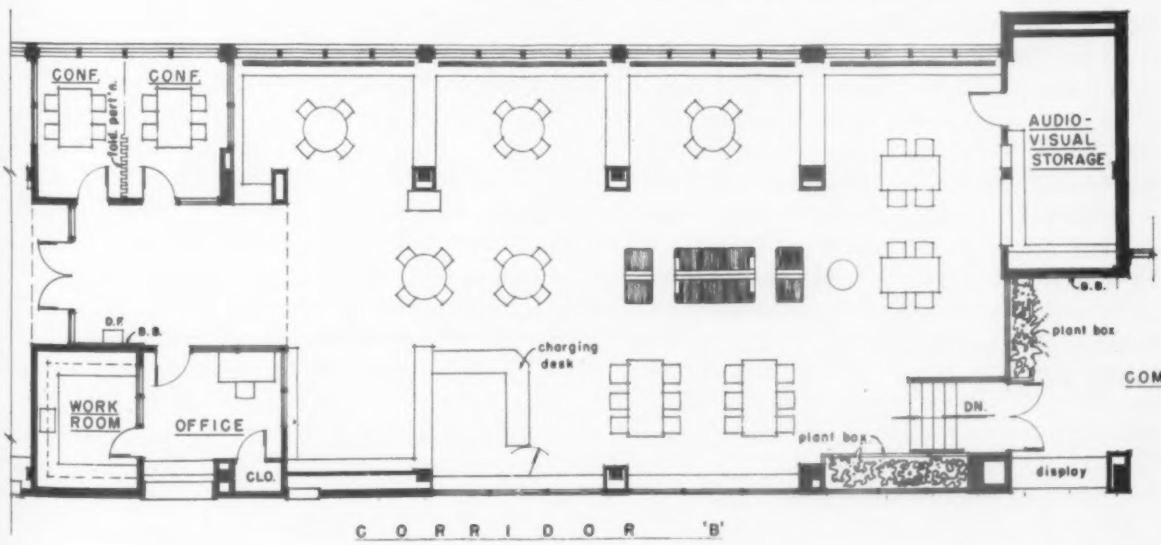
In today's educational scheme, the task of learning is made easier by the use of audio-visual aids. At the front of the room is the soundproof audio-visual room. This room is used for viewing films or filmstrips, for using the opaque projector or for listening to records. Both faculty members and students may avail themselves of the facilities located here.

The library also has an outlet for a television set in front of the room. The school is equipped with a single antenna which serves five outlets, including the one in the library.

The Library Can Be Enlarged

Design is especially important in these days when a growing population sometimes makes a building obsolete before it is released by the contractors. It is not planned that the library in the high school at North Chicago will have to be enlarged. But great foresight in the design of the building would make it possible, should this action be necessary.

The library has two conference rooms, a workroom, the office, main reading room and space for audio-visual storage. A folding partition separates the conference areas.



FLOOR PLAN . . . SCALE 0 5 10 15 20 40 FT.

Hube Henry, Hedrich-Blessing

Students of the Community High School enjoy using their library, whether for formal study and research or for leisure reading and browsing. The south windows are protected from glare by draw drapes. Additional shelter from the sun is afforded by a roof overhang. The lighting is fluorescent strip.

To enlarge the library, the doors to the study hall would be taken out and glass placed in the wall of the workroom. The library would then be double its present size. More conference rooms could be added at the same time.

This careful attention to design has produced a library which is built, truly, for the youth at North Chicago High School. It was not an accident, but the result of studious planning by experts who always kept in mind the reason for their labors: youth must like the library and enjoy using it, whether for formal or informal study and reading.

Lockers in the corridor of the main classroom wing of the East Hartford High School, Connecticut, are recessed into the wall. The full-length lockers have built-in combination locking devices. Architects are Nichols and Butterfield.

STUDENT LOCKERS FOR SECONDARY SCHOOLS

by CHARLES F. RITCH, JR.

Chief, Bureau of Field Services, State Department of Education, Hartford, Connecticut

and WARREN G. HILL

Chief, Bureau of Federal, State and Local Relations, Connecticut State Department of Education

Charles F. Ritch, Jr., attended Duke University and has an A.B. degree from Columbia University and an A.M. from Harvard University. He is presently writing his dissertation to complete doctoral studies at Harvard. Mr. Ritch was a social studies teacher and a school superintendent before joining the staff of the Connecticut State Department of Education in 1950.

Warren G. Hill has a B.S. degree from Gorham State Teachers College, an Ed.M. from Boston University and an Ed.D. from Columbia University. After service as an officer with the U.S. Coast Guard Reserve from 1942 to 1946, Dr. Hill was an assistant to the president and acting president of New Haven State Teachers College. He joined the staff of the Connecticut State Department of Education in 1955.

THE American system of education capitalizes on the interests of the child to promote learning. The phrases, "we recognize individual differences" and "we take each child from where he is," are oft-repeated maxims. Carrying them out necessitates providing each child with the basic information and equipment which he needs to make the progress we expect of him.

We equip him with books, whole series of them. We instruct him in art, and see that he has the proper brushes, paints, pencils, paper, ink and even charcoal. We provide opportunities for his physical development through health and physical education classes as well as organized athletics—and we load him down with uniforms, gym suits, sweat suits, sneakers, cleats, spikes and what have you.

The problem of providing storage for all of this material, as well as for overcoats, raincoats, hats, umbrellas, overshoes and the multitude of other things a student has about him, constitutes one of the headaches which plague school administrators.

School lockers are obviously necessary in today's schools. Over the years we have tried hooks on the walls, closets and cloakrooms, but we owe a debt of gratitude to the unsung hero who first devised a metal locker. Here we have an opportunity for sanitary and safe storage in trouble-free equipment.

The three, four and six-year secondary schools being built in 1955 are as good as we know how to make them. Educators, architects, boards of education, building committees, advisory committees, finance committees, parents, citizens—everyone is concerned with seeing that the best possible result is obtained for the money spent. We want our schools to be adequate for the program planned for them, to look well, to wear well and to be efficient in use. Are we achieving these objectives, in general; and are we achieving them, specifically, with respect to lockers? It is with this latter question that we are concerning ourselves here.

The Adequacy of Lockers

Before a man builds an icehouse, he looks into the physical properties of ice; before he builds a horse barn, he recognizes the eating, sleeping and other habits of horses. Before planning a locker setup for a secondary

Interesting extensions of the classroom wall partitions of the Darien, Connecticut, Junior High School, break up the long corridor and its bank of lockers. The lockers are identified by number plates. Architects of the school are Ketchum, Gina and Sharp of New York City.

Lionel Freedman

school, an attempt should be made to find out *what* the student is apt to store, *where* and for what *periods of time.*

For instance, if art supplies can be stored in lockers especially designed for that purpose in the art area, so much the better. This is true, too, of science, homemaking and shop materials. Corridor lockers may have to provide for some of these things but should not, if it can be avoided.

Corridor lockers, so say our school people and architects, should be placed near the homeroom, and in sufficient quantity to provide one for each student stationed there. Two-to-a-locker is not recommended because of space and control problems. The size should be 12 inches wide by 15 inches deep and at least 60 inches high (72 inches is preferred). The 15-inch depth allows the use of coat hangers and the height should allow topcoats to hang above overshoes and rubbers stored at the bottom. One shelf, 9 inches to 12 inches from the top, allows books to be stored flat and prevents the damage that occurs when books are placed endwise in narrow, double-tiered lockers.

Two types of corridor lockers are shown among the accompanying illustrations. The East Hartford High School lockers are 7½ inches by 18 inches by 72 inches and are of excellent construction. Their flat tops, designed to allow classroom light in the corridors, have not proved a drawback in terms of being catch-alls for

Lens-Art Photo

Lockers in the Frank H. Cody High School, Detroit, Michigan, are fully recessed into the corridor walls and have no jutting projections where miscellaneous litter may accumulate. Architects are Giffels & Vallet, Inc. and L. Rossetti of Detroit.

waste paper, etc. The principal, Mr. Edward Dillon, expressed a preference for a wider locker, however.

The lockers in the Gordon Swift Junior High School in Watertown, Connecticut, shown in another illustration, are 8 inches by 16 inches by 48 inches and have separate book lockers. There has been no problem in the use of these lockers, although the book lockers could be lower. Some question might be raised as to the safety of this type of arrangement. An open book locker door becomes an additional hazard when students are congregated in the area.

Gymnasium lockers are of two types—those in which street clothes are stored while the student is in class or at practice, and smaller lockers that hold gym clothing. This latter type can be either of the regular or basket type. Both have their proponents in use, although the secondary schools built in Connecticut since the war favor the basket type.

One small locker should be provided for each student and a sufficient number of the larger ones to allow for the largest group that may use the facility at any one time. Preferred sizes are 12 inches by 15 inches by 60 inches for the larger lockers, and 7½ inches by 15 inches by 20 inches for triple-tier gym lockers. The 60-inch height is recommended because it permits a better opportunity for supervision and cuts down on horseplay. Wire baskets are less expensive, but require the folding of gym clothing with some loss of efficiency in ventilating, and are possible safety problems if underfoot.

Staples Foto Shop

Half-length lockers were installed in the corridor of the Chico, California, Junior High School, L. G. Thomson, architect. The wide corridor prevents pupil traffic jams.

The Appearance of Lockers

Locker installations should look well. The old idea of standing lockers on legs in order to hose down under them no longer wins any support. A more sanitary and sightly arrangement has been arrived at by placing them on bases. Corridor lockers, where the introduction of light is not a problem, should have the space between their tops and the ceiling furred out flush with the locker face. This is costly, but provides a neat, clean appearance as well as providing space for ventilation ducts. Where such space is left open, the use of sloping-top lockers obviates the problem of waste materials being deposited on top of the lockers.

It is possible now to obtain lockers in a number of attractive colors that harmonize well with school color schemes. Finishes are normally attractive, durable and easy to keep clean.

The Maintenance of Lockers

Care should be taken, in selecting lockers, to choose those that stand the best chance of giving long and trouble-free service. Some things to watch are:

1. *Locks.* Connecticut's educators and architects favor master-keyed combination locks as their first choice, even though there is a problem of noise. Secondly, they prefer built-in combination locks which are less noisy but require more attention. Thirdly, and a poor last, are locker keys—primarily because of lost keys and the great amount of time necessary to supervise the operation of the system. Principals wax wroth over the complications of custody cards, deposits, duplicate keys, complicated key cases, etc.

2. *Locking mechanisms.* Most lockers are locked with a bar arrangement that secures the door by introducing the bar into a recession at top and bottom of the locker. If this arrangement is poorly made, the bars lose alignment or bend and the locker cannot be

locked. Maintenance men spend an inordinate amount of time adjusting and repairing such equipment. The girls can't open their lockers because they use too little force and the boys can't close theirs because they've used too much. Buy as sturdy and efficient equipment as possible in this respect.

3. Hinges. Test these for strength and figure out how to repair one should it be broken.

4. Numbers. These should be fastened so that they are not easily removed. It is hard to visualize why anyone would want a locker number but many disappear over a period of time if they are "takeable."

The Efficiency of Lockers

To have lockers that are efficient in use, we should plan carefully for the following things:

1. Ventilation. Lockers not only have to look good, they also have to smell good. If we are attempting to teach our students good personal habits, we must supply them with storage space that does not affront such habits. Corridor lockers can be given positive direct ventilation by integrating them with the return system, and venting them through the tops or backs.

H. Harri Malootian

In the Gordon C. Swift Junior High School, Watertown, Connecticut, separate book lockers are provided above the clothing lockers. This eliminates the necessity of a wide locker. The architect is Warren H. Ashley of West Hartford, Connecticut.

A compromise can be effected by venting them into the corridor by means of louvers in the doors and exhausting the corridor. Gymnasium lockers should definitely have positive ventilation, with special provision for ventilating the entire rooms where tote baskets are stored. The use of equipment drying rooms should also be considered when an extensive athletic program exists.

2. Location. Corridor lockers, as previously mentioned, should provide space for a student adjacent to his homeroom. Gymnasium lockers should be located where they are readily accessible to both playing floors and playing fields. A preferable location is on the first floor level rather than in the basement and should have adequate lighting and ventilation.

The new high school designed by architects Ebbets, Frid & Prentice and being built at Manchester, Connecticut, will have a series of locker rooms, each providing a tote basket setup for 40 students, together with group showers and drying rooms. This is an attempt to avoid a huge locker room area and, at the same time, to provide adequately for visiting teams. Team rooms, incidentally, should permit the most direct route possible from the playing floor—there is no point in increasing the opportunity for spectators to molest the players.

3. System. School administrators should take careful note, in assigning lockers, that congestion is not increased as a result of poor planning. Students in a given class should be assigned gymnasium lockers that are remote from each other. Six persons trying to use one bench can create real problems. Where girls' lockers are concerned, the use of individual showers requires a careful assignment of lockers if undue delay is to be avoided.

4. Miscellaneous. As a last point and a catch-all, this item includes such things as these: don't cross lines of traffic to locker rooms with boys and girls in the gym—someone may get pinched; don't allow visiting teams to use the girls' lockers without a careful check—some of the notes the boys leave may be honeys; don't allow horseplay of any type or degree—it's very easy to get hurt in a locker room.

A Wide Choice Is Available

Let it be said for the record that there is a wide choice of excellent lockers on the market today. You can get just about what you want. We urge you to determine your locker needs well in advance of actual use and insist on getting the equipment that will do the job you want done.

PLANNING A NEW COLLEGE OF EDUCATION BUILDING

by JOHN W. GILLILAND

Professor of Education, The University of Tennessee, Knoxville

Dr. Gilliland has had a wide and varied experience in educational administration from his days as a school superintendent in 1927 until his appointment as Professor of Education at the University of Tennessee in 1951. He has an A.B. degree from Southwest State College, an M.A. from University of Missouri and an Ed.D. from New York University.

and MALCOLM H. RICE

Consulting Architect, The University of Tennessee, Knoxville

Malcolm Rice graduated from the Yale University School of Architecture in 1919. He has had 35 years of experience in the planning and supervision of university and public buildings. Mr. Rice has done research work in the Orient and Europe and is a member of the American Institute of Architects. He has a Civil Service rating at principal architect.

UPON the recommendation of C. E. Brehm, president of the University of Tennessee, a new building for the College of Education was approved by the Board of Trustees in September, 1954. The building was to be financed by an appropriation of $1,000,000, to be requested at the 1955 session of the Tennessee Legislature. This appropriation was to provide for the building, equipment, site and architect's fees to make the plant a complete operating unit.

A building committee was appointed by President Brehm which included the vice president of the university, the director of physical plant, the business manager, the dean of the College of Education and four members of the college staff. This committee could be termed an advisory committee and merely received reports from time to time from a College of Education committee composed of heads of departments. This latter committee was to plan general overall policies regarding office size, number of classrooms, conference and workrooms, air conditioning, etc.

A subcommittee, composed of the dean of the College of Education and two members of the staff, was set up by the College of Education committee. The subcommittee's function was to work with the university architect in developing preliminary drawings as to space requirements and, in general, would have an expediting function to carry out decisions of the college-wide committee on overall policies and functions.

The Site of the Building

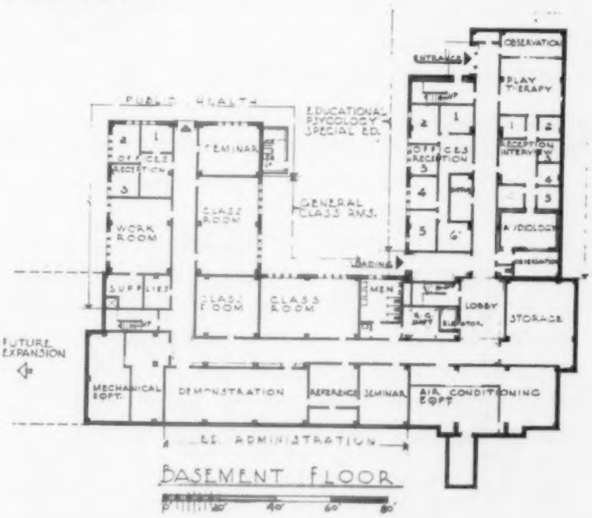
The site had already been selected as a part of the long-range university master plan. The contour of the land had special influence upon the building. The differentials in grade to a depth of 27 feet from the front to the back of the site permitted a multi-level type of building with direct access from grade levels to three separate floors.

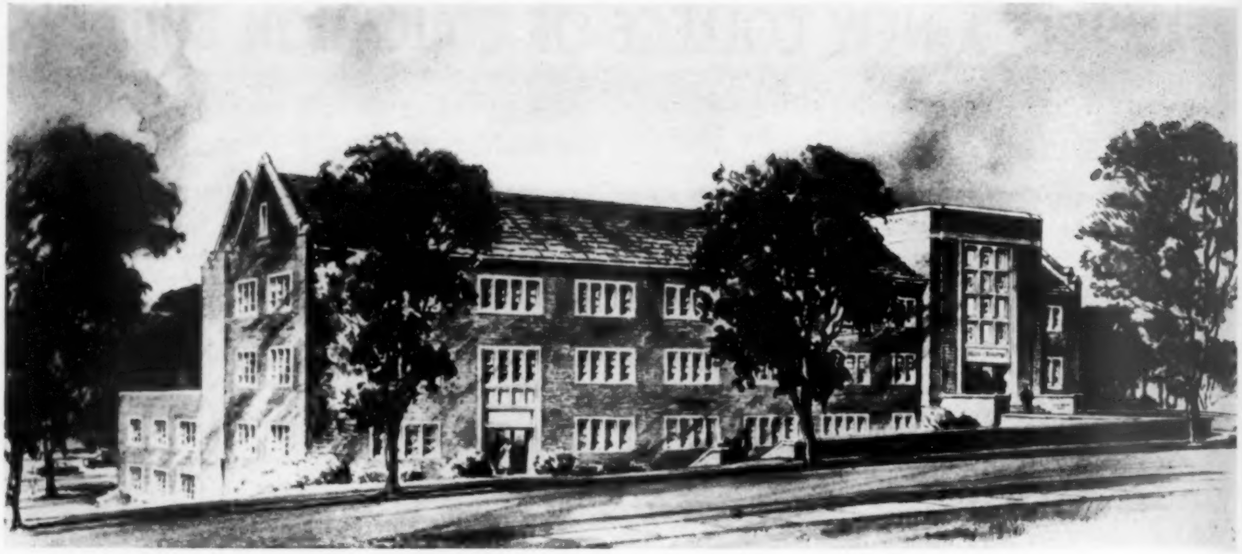
The limits placed upon the program by reason of budget allocations were severe in that six pieces of property had to be purchased and buildings removed at a cost of about $100,000, deductible from the $1,000,000 appropriation. The land purchases, however, included property necessary for future expansion.

Basic Considerations

The staff of the College of Education arrived at certain conclusions regarding the program as well as the departments to be housed in the new building

Basement floor of the new College of Education has general classrooms, reception areas and rooms for mechanical equipment and storage purposes.





All departments of the University of Tennessee College of Education contributed to the planning process behind the new building. Criticism was also invited from them.

and, on the basis of these conclusions, certain recommendations were made to the building committee. Recommendations made by the staff and approved by the building committee called for the inclusion of the following:

1. A building planned to take care of an enrollment of approximately 1,000 students at the undergraduate and graduate levels. (Building planned for future expansion.)

2. A building designed for air conditioning.

3. Ten regular classrooms of varying size to be used by all departments. This figure was arrived at after a classroom utilization study was made for peak enrollment periods.

4. Offices 10 by 12 feet in size and arranged in a group for each department with one more office per department than is actually needed to house the present staff. (Offices were planned so that there would not be more than one staff member in each office. Experience had indicated that large office space usually meant two staff members to an office.)

5. Study and work space for students as well as seminar and conference rooms.

6. Each classroom acoustically treated and with adequate lighting.

7. Sufficient space for an audio-visual and materials laboratory to implement more fully a good program of teacher training in this area.

8. An education reading room planned to serve as a central source of information. (This room is located to allow maximum space on the top floor where safety codes permitted the elimination of corridor space, thus increasing net usable area.)

9. A multiple purpose room which will seat about 300 persons, with an adjoining pantry. (This room is to be used for large group meetings, conferences and social gatherings.)

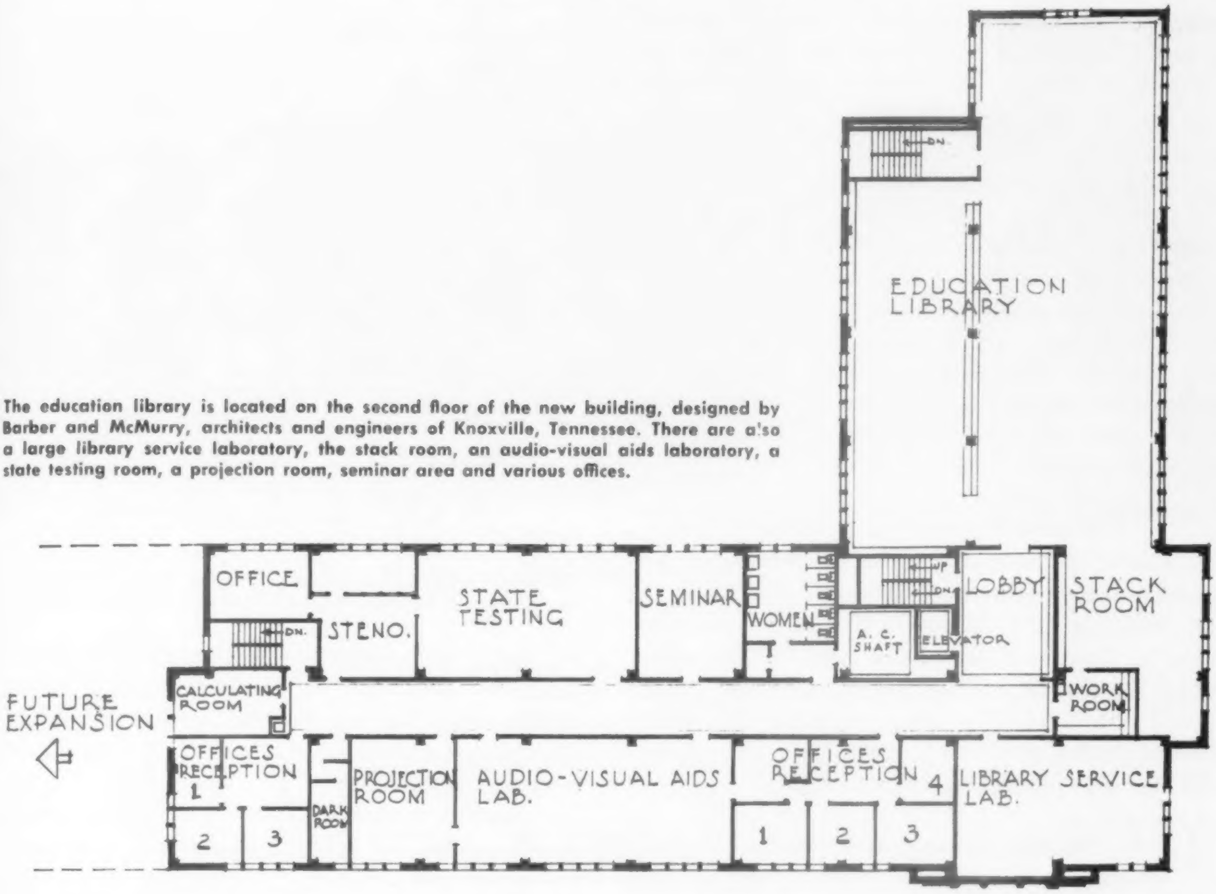
10. Art education and industrial arts to be adjacent to each other in order to more effectively utilize space.

11. A special education department located on ground floor level to provide for ease of entrance by handicapped pupils.

A large assembly room, classrooms, offices, workrooms and spaces for ceramics and textiles are located on the school's ground floor.

Departmental Plans

Each department developed simple plans showing the amount and kind of space it would like to have in the building. These sketches were presented to the staff as a whole for constructive criticism. Some good suggestions were made and some college-wide use of space was visualized as a result of these discussions. Requested space varied greatly. The total space requested was some 40 percent more than could be included, considering the limited appropriation. All



The education library is located on the second floor of the new building, designed by Barber and McMurry, architects and engineers of Knoxville, Tennessee. There are also a large library service laboratory, the stack room, an audio-visual aids laboratory, a state testing room, a projection room, seminar area and various offices.

departments next attempted to cut down on their requests by including what was actually needed rather than what they would like to have.

On the whole, the staff was cooperative in this respect, as the next requests seemed reasonably possible of fulfillment. The College of Education building committee approved the requests and delegated the responsibility to the three-member subcommittee to work with the university architect in developing the preliminary plans. The plans were then printed and sent back to each department for review and eventual approval.

Working closely with the architect and after several months of intensive work which involved considerable revision in planning, a final report was presented to the university committee. The report included a general discussion of the various aspects of the building including cost limits as well as a series of space use drawings. It remained, then, for the architect to translate the final approval of the report into specific form, utilizing space to meet needs. Each space was then analyzed with three points in mind, namely: (a) what is to be done in the space? (b) who and how many persons will use the space? and (c) under what conditions will the space be used?

Thus, study sketches and descriptions were made showing the size and shape and required teaching aids, such as chalkboards, tackboards and display spaces. When these had been approved by each department final schematic drawings and a program of requirements were submitted to the firm of Barber and McMurry, Architects, who designed and prepared final plans and specifications.

It was felt that a major requirement of the program was building flexibility—the ability to change the size and use of spaces. This was achieved primarily by the modular planning of the structure. Building length was planned in multiples of three feet, with width in multiples of two feet. Partitions, light fixture outlets, ducts, etc., all related directly to these modules. Partitions could be moved without structural changes due to the spacing of interior columns.

The Education Library

Library quarters in the new building were planned with much staff and committee consideration of the types of materials needed and the ways the library might function in the College of Education program as a service facility for students and faculty. Types of materials which are to be brought together for convenient use to serve all departments, in so far as possible, include: a basic collection of education books and reference tools (many others serving more than one college, and especially graduate students, to remain in the main university library); education peri-

odicals, current and back numbers; curriculum materials, including courses of study, bulletins, public school textbooks, workbooks, and teachers' manuals; and current material from many areas of education, organized in files, such as professional pamphlets, conference reports and mimeographed bulletins.

Adjoining, and only partially divided, will be a center for a wide sampling of children's and young people's materials for the use of students who are preparing to teach at various grade levels. These will include books for reference and for informational and recreational reading, pamphlets, sample periodicals for children and young people; pictures, charts, maps, posters and other graphic materials; filmstrips and slides; phonograph and tape recordings.

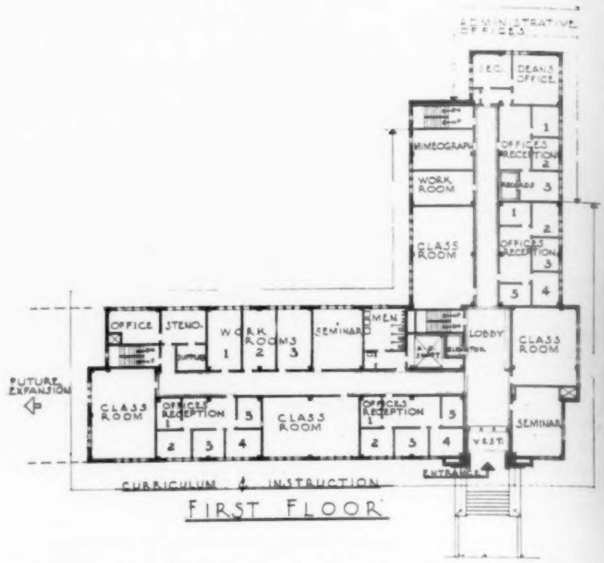
Portable Previewing Equipment

Simple, portable equipment for previewing and listening to these materials will be provided for use in the library and for borrowing to use in classrooms. Near the library are located two laboratory-type classrooms for teaching courses in materials and library service with facilities for using, displaying and making material—including an audio-visual laboratory, projection room and photographic dark room.

Special Education Services

For cooperative services to exceptional children and their parents, the office suites, seminar rooms and laboratory facilities for special education and educational psychology are located in adjoining space on the ground floor adjacent to parking and playground areas.

Recognizing the need for specialized facilities in the area of speech and hearing, a speech and hearing clinic was included for the purpose of training teachers for this work. The unit features two soundproof audiology rooms, as well as a series of individual speech therapy cubicles.



The dean's office and other administrative areas are located on the first floor of the university's new College of Education building.

A well conceived play therapy room was planned for use within the training programs of educational psychology and guidance. The room was designed in such a way that children might work out their adjustment problems in a setting which provides observational and direct training possibilities. Because of the specialized nature of the program unique equipment, found to be most practical, is to be installed.

Brennan Memorial Library at Our Lady of Cincinnati College, Edgecliff, is a $200,000 structure and was designed by Maguolo and Quick, architects. At present the library houses more than 20,000 volumes.

DESIGNED IN THE MODERN MANNER—BRENNAN MEMORIAL LIBRARY

by SISTER MARY ANNRITA, R.S.M.

Assistant Librarian, Our Lady of Cincinnati College, Edgecliff, Cincinnati, Ohio

Sister Mary Annrita, R.S.M., taught in elementary and secondary schools of Cincinnati prior to obtaining a degree in Library Science. She received her M.A. from Rosary College, River Forest, Illinois. After spending two years as librarian at Our Lady of Mercy High School in Cincinnati, she was transferred to Our Lady of Cincinnati College as assistant librarian.

SINCE June, 1954, a new building has become part of the scenic campus of Our Lady of Cincinnati College, Edgecliff, Cincinnati, Ohio. Brennan Memorial Library, named in honor of Mother Mary Hilda Brennan, R.S.M., founder and first president of the college, is adequately equipped for current needs, with a view toward planned expansion. An important unit of the college, this modern library is the fulfilled dream of many years.

Our Lady of Cincinnati College was opened in September, 1935, in the former Emery mansion, overlooking the beautiful Ohio River. The library of the college originally was located in two rooms on the second floor of this building. When the library outgrew its accommodation it was moved to a separate building, the Edward Senior home on Victory Parkway, which was purchased for that purpose in 1937. At this location the library expanded and served the student body very efficiently for another year.

When the new administration building of the college was completed in September, 1938, the library was again moved to the Emery building. Here it occupied the second and third floors, and the first floor was used as a social hall for collegiate activities.

Expansion Was Necessary

As the library increased its number of volumes and quantity of other supplementary material, it was again found necessary to expand. The Fredericks homestead, a residence north of the Senior home, was purchased to accommodate the needs at that time. In the spring of 1942 this building was made available to the students as a library. It proved to be satisfactory for a period of ten years but crowded conditions and an

The main reading room has open stacks on one side and a window wall, facing the Ohio River, on the other. Colorful draw drapes are at all the windows.

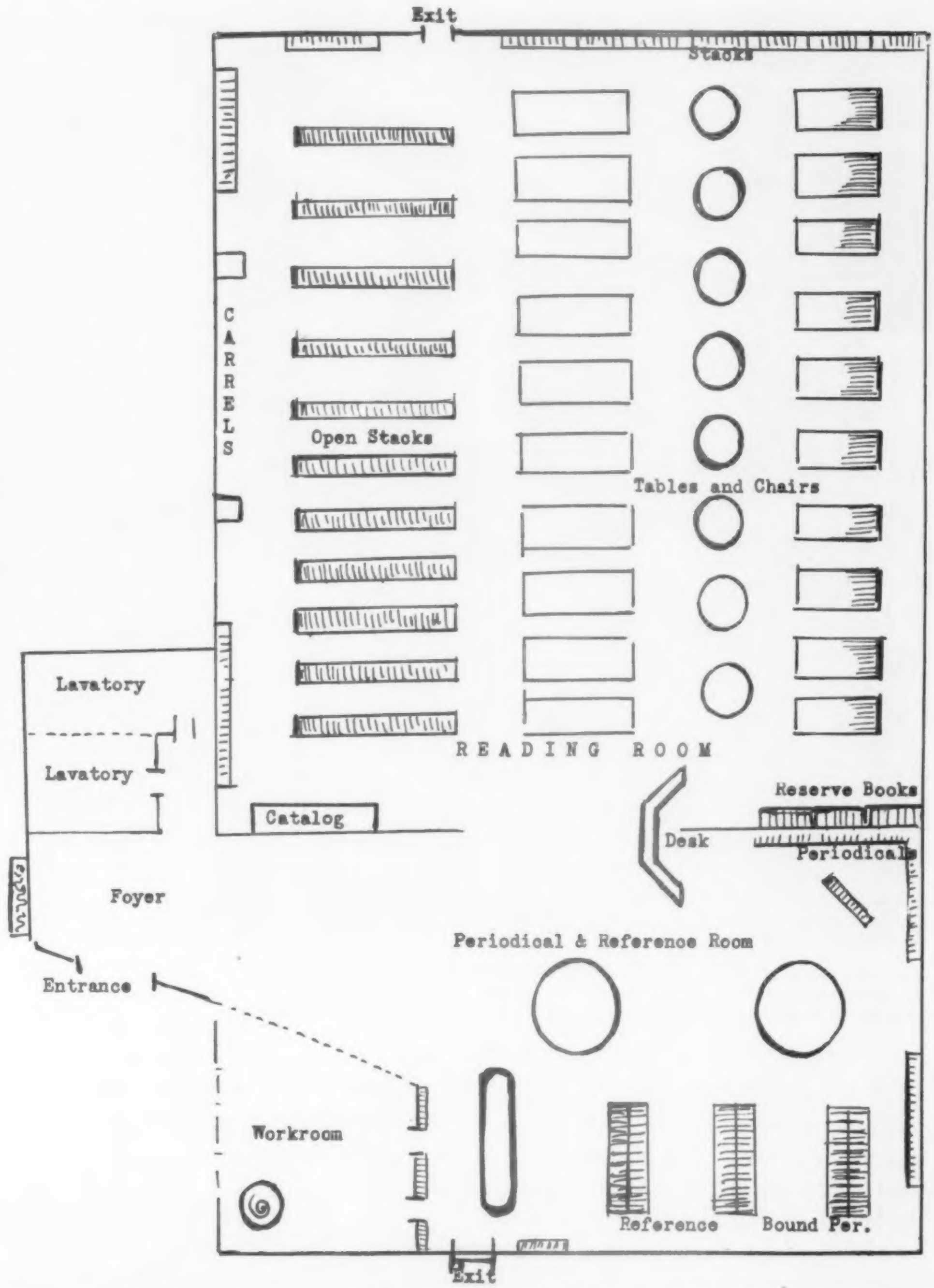
inadequate capacity for seating and holdings finally caused a new building to be proposed.

Beautiful, But Simple

This recently completed $200,000 structure, planned by Maguolo and Quick, architects, is beautiful in its simplicity. The laminated arched ceiling, fluorescent lighting, attractive drapes and bright walls finished in cement block and plain brick bring out the modernistic trend found in American buildings today. The heating and ventilation system is thermostat-controlled, and filtered-air compartments provide fresh air to the rooms at all times.

The entrance to Brennan Memorial Library leads directly into a foyer, giving an immediate atmosphere of quiet before one approaches the main rooms. A portable bulletin board, which serves as a silent announcer of recent acquisitions, schedules and library notices, is at one side. The charging desk is in a pivotal position, being situated between the reading room and the peri-

The periodical and reference room has round birch tables and upholstered chairs. Open stacks house the bound periodicals and reference books.



Brennan Memorial Library has two main areas, the reading room and the periodical and reference room. The charging desk is conveniently located between the two sections. Individual research is encouraged with material placed on open stacks and carrels available to the students.

odical room. It faces the foyer, thereby giving a full view of the occupants in the two rooms as well as those students, faculty members and visitors who are entering the library.

The east wall of the spacious reading room, which faces the Ohio River, is made entirely of glass. The room is an attractive, cheerful place in which to read and work. On the west side are open stacks which have proved their worth, for they contain material easily reached by all. Such an arrangement invites the users to browse leisurely as well as effectively.

The informal atmosphere of helping oneself encourages borrowers to rely on their own resources to develop skill in the fundamental methods of research and to take full advantage of the library's facilities. When particular assistance is needed, members of the library staff are always available to aid students. Round tables, which have recently been added, are placed between the two rows of rectangular tables, giving a comfortable appearance to the room. Carrels, too, have made individual research both convenient and attainable.

Periodical and Reference Room

Adjacent to the reading room is the periodical and reference room which is furnished with round tables of light birch and upholstered chairs. Display cases, containing the learned journals and current periodicals, do

The glass east wall of the reading room contributes to its bright and cheerful atmosphere. Furniture consists of rectangular and round tables with straight back chairs. The walls are finished in cement block and brick.

much to make one feel at home with an easy-to-reach magazine or newspaper. A bookshelf of blonde wood serves as a counter surface where the most frequently used indexes are found. Open stacks satisfactorily house the bound periodicals and reference books.

Below the well equipped office and workroom is a stack room which is made accessible by means of a spiral staircase. This room holds back issues of periodicals, superseded editions and little used books.

The present holdings of the library exceed 20,000 volumes of reference works and books of general and specific interest. The library subscribes to more than 250 periodicals, which include the professional journals requested by the various departments, and a number of leading daily and weekly newspapers. In addition to these, 625 bound volumes of periodicals are always available.

A Library for Today and Tomorrow

Although the need for further expansion of the present building is not expected for several years, it is not being overlooked. Such anticipated expansion is included in the site development of the additional buildings which will be erected on the college campus in the near future. However, because of its existing space and facilities for seating and for the housing of library materials, Brennan Memorial Library is suitable for present-day needs at Our Lady of Cincinnati College.

AUDITORIUM AND THEATRE PROJECT FOR BROOKLYN COLLEGE

by RANDOLPH EVANS

Partner, Chapman, Evans and Delehanty, Architects and Engineers, New York City

Randolph Evans, a native of Alabama and an alumnus of the State University, has practiced architecture in New York for 25 years. The Board of Higher Education retained him as the architect for Brooklyn College in 1935 and he and his firm have been responsible for all of the college buildings there. The firm is actively engaged at present in the design of educational buildings in many locations.

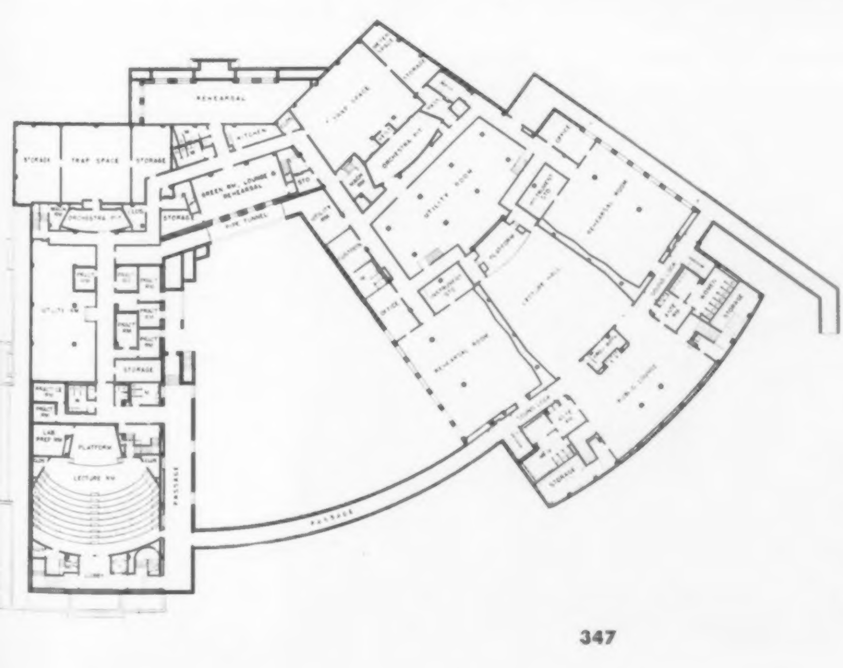
BROOKLYN College, a coeducational institution of liberal arts and science, is located on a forty-two acre campus in the geographical center of Brooklyn. The college has an enrollment of 21,000 students, and is now probably the largest liberal arts college in the world. Its first buildings, less than twenty years old, were originally designed to accommodate a maximum enrollment of 8,000.

Walt Whitman and George Gershwin Halls, recently completed, are the first new buildings to be added to the college group. Walt Whitman Hall is an auditorium with a seating capacity of 2,500. George Gershwin Hall seats 500 and is a theatre that meets the standards of Broadway's best playhouses. The halls are joined at the stage and enjoy a common dock, shop, dressing and make-up rooms.

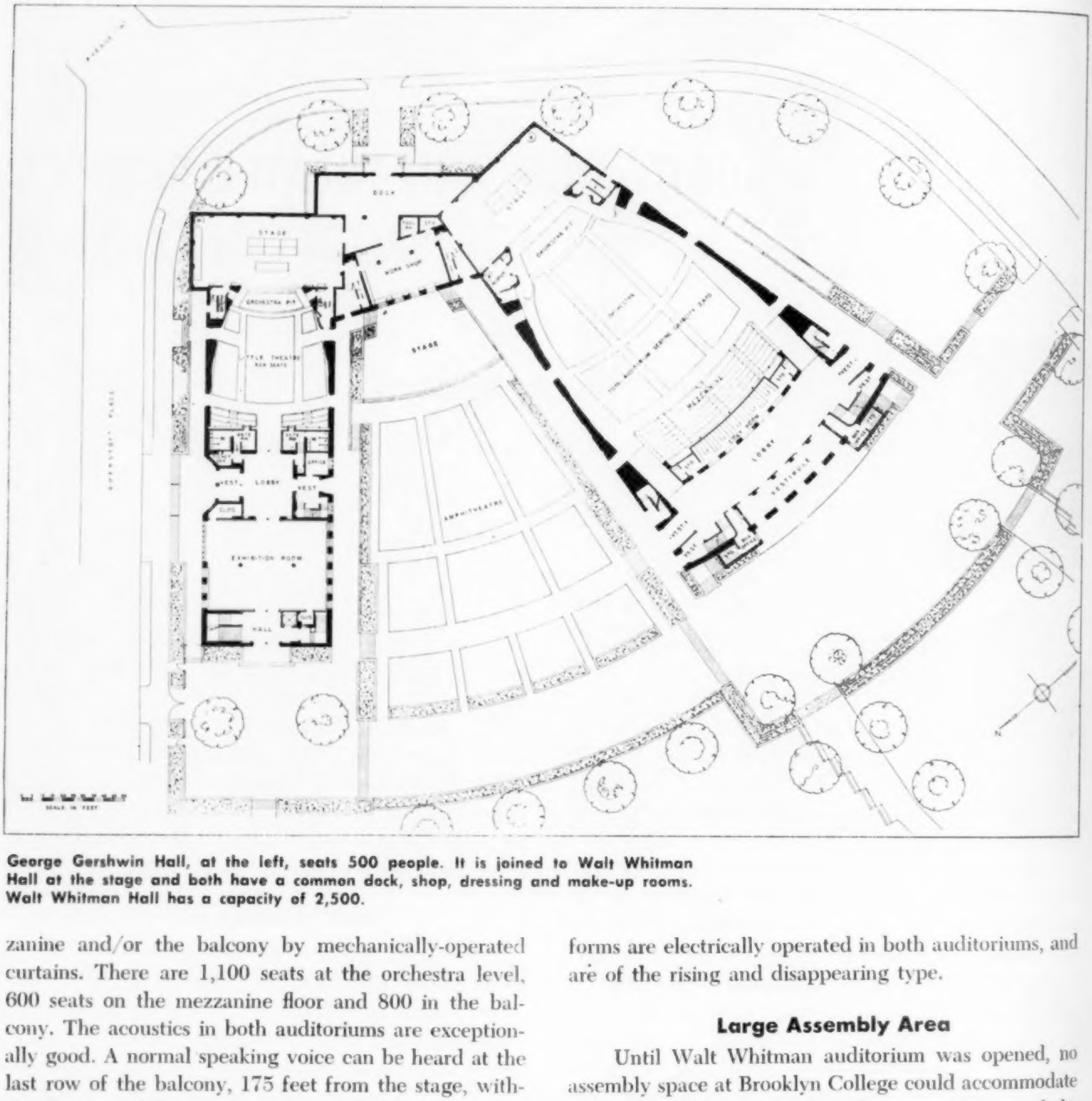
This project is a structure of contemporary Georgian architecture. The ground area covered by the buildings is approximately one acre in size. The entire project contains 2,500,000 cubic feet of space and the cost to complete was four million dollars. The building frame is of steel construction with tile and brick finish.

Walt Whitman Hall

The 2,500 seats in the large auditorium of Walt Whitman Hall may be divided by cutting off the mez-



The basement area of Walt Whitman and George Gershwin Halls is connected by the Green Room lounge and rehearsal hall. Lecture and rehearsal rooms, practice areas, utility rooms, storage facilities, the kitchen and rest rooms occupy most of the basement space.

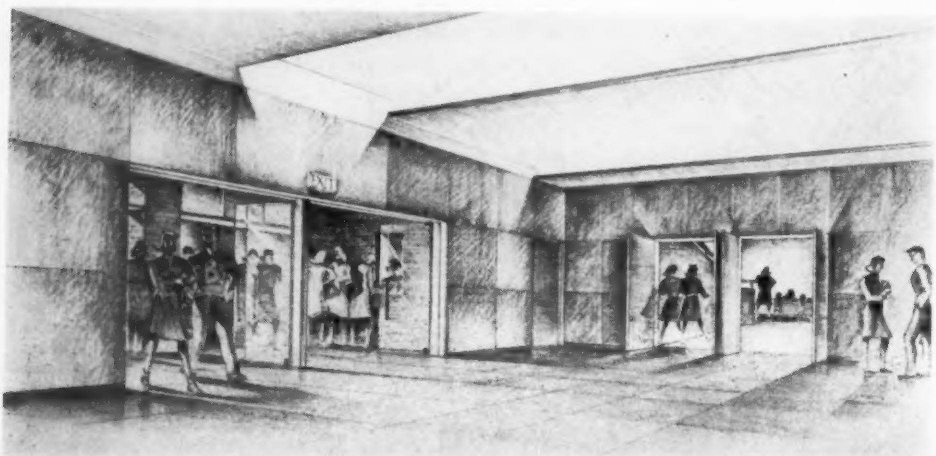


George Gershwin Hall, at the left, seats 500 people. It is joined to Walt Whitman Hall at the stage and both have a common dock, shop, dressing and make-up rooms. Walt Whitman Hall has a capacity of 2,500.

zanine and/or the balcony by mechanically-operated curtains. There are 1,100 seats at the orchestra level, 600 seats on the mezzanine floor and 800 in the balcony. The acoustics in both auditoriums are exceptionally good. A normal speaking voice can be heard at the last row of the balcony, 175 feet from the stage, without the use of the speaker system. Orchestra pit platforms are electrically operated in both auditoriums, and are of the rising and disappearing type.

Large Assembly Area

Until Walt Whitman auditorium was opened, no assembly space at Brooklyn College could accommodate more than 200 persons, less than one percent of the



The lobby of the little theatre has two vestibules and also opens into a large exhibition room.

student body. Now more than ten percent of the entire enrollment can meet, see their president, present programs and carry on various activities.

The auditorium is lighted indirectly and the stage is completely lighted with the most modern of equipment. The floors are asphalt tile and the walls and ceilings are treated with hard plaster and acoustical plaster.

George Gershwin Hall

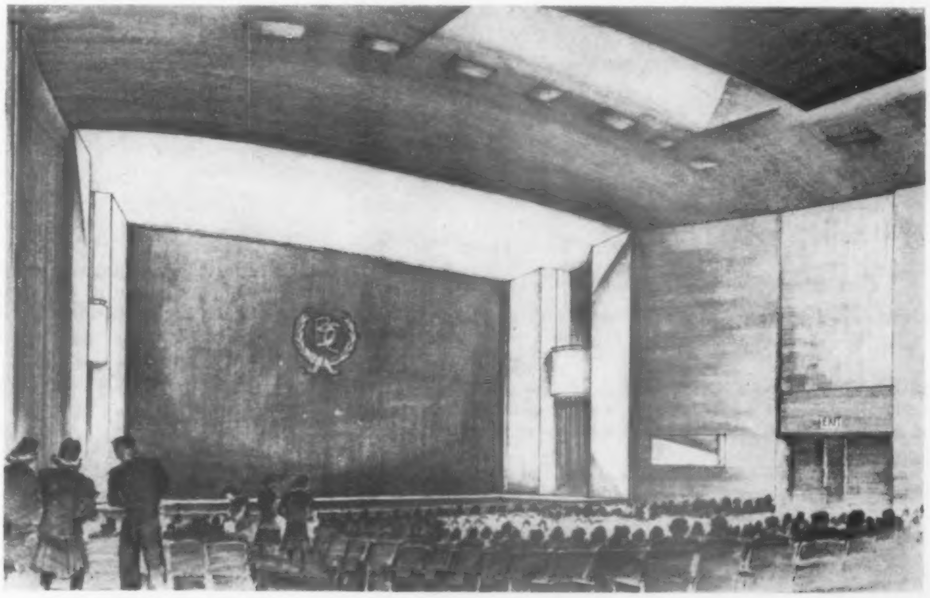
The theatre, seating 500, is available for many purposes—music, drama, lectures and extra curricular occasions. The project, before dedication, was known as the college center, a term appropriately expressing its function of providing much more than just auditorium seating.

A music department has been incorporated in the new building. This consists of seven classrooms, rehearsal practice rooms, staff rooms, recording rooms, a music library and offices. The entire music department formerly occupied space in academic quarters and has now surrendered valuable area for more compatible uses.

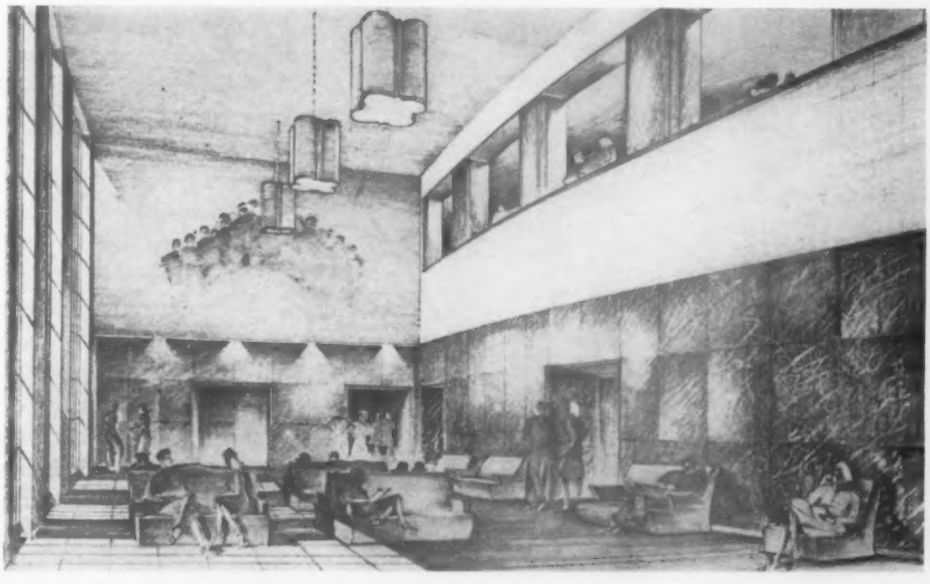
Other Areas Provided

Brooklyn College has long been in need of sufficient lecture rooms. Two large areas have been provided, one seating 350 and the other 250. Each lecture room is equipped with preparation rooms and adequate storage areas.

City colleges are unique in that all students live at home; no dormitories exist at any of these institu-



The interior of the little theatre in George Gershwin Hall. This theatre is fully equipped to meet the standards of Broadway's best playhouses.



The student lounge is at the mezzanine level of Walt Whitman Hall. This room is two stories high and has a window wall which reaches from floor to ceiling.

tions. However, there are not enough study and recreational accommodations where students may relax between and after classes. To meet this requirement, three spacious lounges have been provided; the largest measures 27 feet by 90 feet and is equipped with a complete kitchen. An exhibition hall has also been included which has a 2,500 square foot area.

The Planning Processes

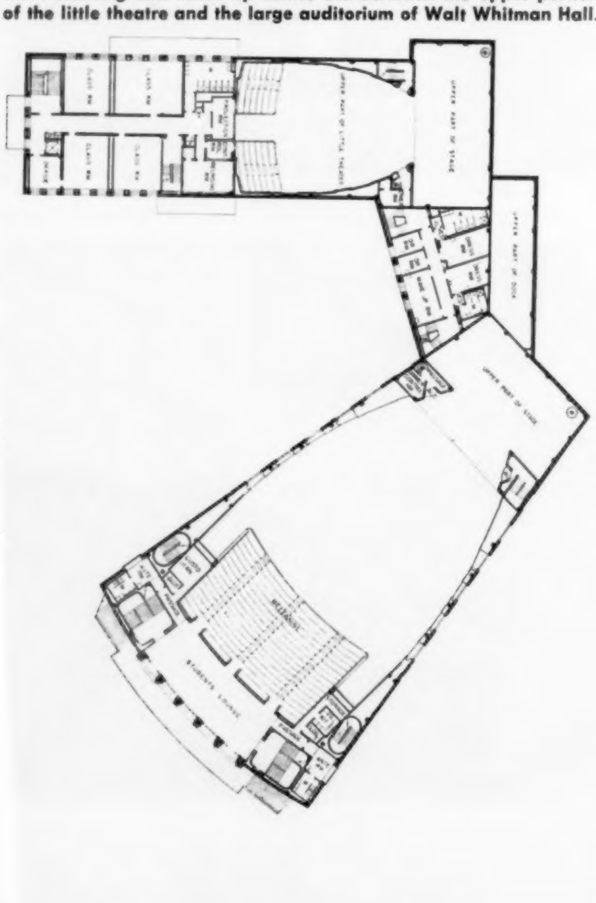
The planning of the auditorium and theatre project was carried on by a building committee appointed by President Harry Gideonse. Dr. Gideonse, himself, contributed actively to the work of the committee, together with Arthur Hillary, business manager, Dean Thomas E. Coulton, Dean Frederick W. Maroney and Professor Maurice Lieberman, head of the music department. Many special planning sessions were held between the architects and members of the building committee.

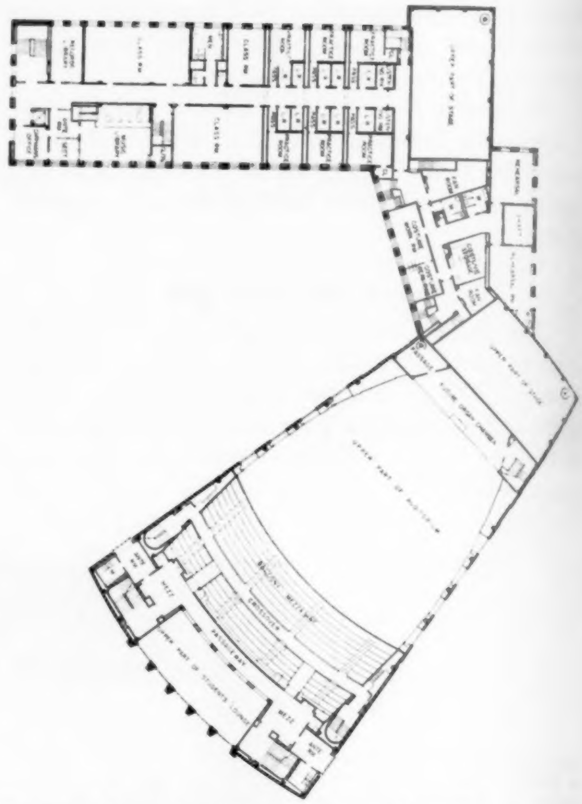
Student participation in this program was conducted on a departmental level. The architects were not directly concerned at this stage. However, the interests and suggestions of the students were carefully considered and incorporated wherever possible.

Architecture of the Structure

Our firm, Chapman, Evans and Delehanty, Architects and Engineers, first knew Brooklyn College when

There are four classrooms on the second floor of George Gershwin Hall. Dressing and make-up rooms are between the upper portion of the little theatre and the large auditorium of Walt Whitman Hall.





The music library, classrooms, practice and listening rooms are at the third floor level of the Brooklyn College Arts Center. A future organ chamber is designated for Walt Whitman Hall.

it was tenanted in office space in the Borough Hall section of Brooklyn. In 1935 we designed and supervised the construction of the first five buildings on the present campus. The campus, irregular in shape, measures 600 feet in width and nearly 2,000 feet in length. The site, unfortunately, is bisected by a principal city artery, Bedford Avenue.

A symmetrical layout, providing a central mall, was decided upon. Traditional Georgian architecture was the style, making use of a very fine, oversized, handmade brick. The buildings were carefully proportioned. We used large windows, a slate roof and brownstone quoins at the corners. Two large buildings were placed on the long side of the mall, with a library on the center line. The library now is to be enlarged to three times its original size and book capacity. This is another story that may be told later when construction is complete.

Architecture, building requirements and money values all change in twenty years. Those of us who are old enough to compare conditions in 1935 with those of 1955 must agree. We continue to be architects at Brooklyn College, and our efforts are directed to designing contemporary buildings which are sympathetic to and compatible with our original designs of a score of years ago. Walt Whitman and George Gershwin Halls reflect our endeavor to do just that.

EXPANSION AT CONCORDIA COLLEGE— A NEW SWIMMING POOL AND DORMITORY

by OLIVER C. RUPPRECHT

Associate Professor of English and Director of Public Relations, Concordia College, Milwaukee, Wisconsin

Oliver C. Rupprecht is a graduate of Concordia College and received his B.D. degree from Concordia Seminary. He also completed graduate work at Concordia Seminary and received an M.A. from Marquette University. Prof. Rupprecht was pastor of the Redeemer Lutheran Church in Evansville, Indiana, from 1928 to 1937. He has been on the staff of Concordia College since 1938. He is the co-author of *The Musical Heritage of the Church, Volume 3; Spiritual Growth and Professional Ethics* and is the translator of *J. S. Bach* by Dr. Wilibald Gurlitt. Prof. and Mrs. Rupprecht are the parents of nine children, eight of them living.

Do ministerial students receive a well balanced education? Does their academic program consist of a well rounded curriculum? Is their leisure time enriched with opportunities for wholesome social development?

These questions are of particular concern on the campus of a school like Concordia College, Milwaukee, Wisconsin, where students receive pre-ministerial training in a four-year high school department and in a college department on the junior level.

In the twentieth century one would hardly expect to find a ministerial training program anywhere in the United States that does not make provisions for the right kind of academic and social development of its students. Yet the opinion persists in the minds of some people that schools devoted to the education of ministers are not only set apart from other schools but are out of touch with life and removed from the main and normal currents of human activity.

It is true that ministerial schools are, or ought to be, distinct from institutions carrying on a program of general education. All professional schools are asked to reach specific goals and to maintain high standards. The same situation exists in schools of law, medicine, engineering and the like. In all of these institutions we expect to find special emphases pertinent to the particular objectives involved.

Aims of the College

During the seventy-five years of its existence, Concordia College, Milwaukee, Wisconsin, has endeavored to give its students adequate preparation for the

Pritzlaff Hall, the new dormitory at Concordia College in Milwaukee, was designed by Edgar A. Stubenrauch and Associates of Sheboygan. The accommodations within the building include bedrooms for four persons adjoined on either side by study rooms for two.

The swimming pool was provided at a cost of $175,000, and has all the equipment for fun, recreation and learning in the water.

There is a student union room in the basement of Pritzlaff Hall, the newest dormitory building to be constructed at Concordia College.

many-sided work of the ministry. Founded in 1881, Concordia has been associated with nine similar preparatory schools in various parts of the United States and Canada. All of these schools are owned and operated by the Lutheran Church, Missouri Synod.

Together with two seminaries and two teachers colleges, these institutions are under the direct supervision of local boards and under the general supervision of the Lutheran Board for Higher Education, with headquarters in St. Louis, Missouri. Dr. Walter C. Birkner of Fort Wayne, Indiana, is chairman of this board; Professor Walter F. Wolbrecht of St. Louis is the board's executive secretary. Graduates of the ten preparatory schools, having received a thorough liberal arts education with special emphasis on classical and modern languages, complete their training at Concordia Seminary in St. Louis.

One of the worst enemies of education is smugness. The true educator is alert to change, even as he is discriminating and selective in his adoption of new materials and methods. While the board and faculty of Concordia College have not been indifferent to the continuing need of surveying and revising Concordia's academic curriculum, it is only fair and accurate to say that during the past twenty-five years of Concordia's history the greatest changes have taken place in the areas of athletics and social competency.

The New Swimming Pool

Concordia's new swimming pool, dedicated on March 13, 1954, marks the culmination of an intensive physical training program initiated twenty-seven years ago and still conducted by a man of unusual ability and energy—Coach William C. Ackmann. An ordained minister who once served a parish in Colorado, Coach Ackmann has held an almost lifelong conviction that a ministerial education should include abundant opportunity for physical training, both for the sake of character development and body growth.

In 1927 Mr. Ackmann offered his services to his old alma mater and served without pay for one year to demonstrate the value and feasibility of a physical training program at Concordia College. No impractical visionary, Coach Ackmann developed a program which became established and received enthusiastic endorsement on its own campus, and which has also gained recognition in other circles.

The new swimming pool, annexed to the north side of the college gymnasium, was built at a cost of $175,000. This sum was raised by voluntary contributions from individuals and groups in the Wisconsin area. The architects were Edgar A. Stubenrauch and Associates of Sheboygan, Wisconsin.

Facts and Figures

The pool building is 62 feet wide and 112 feet long. Constructed of red brick trimmed with grey stone, its height from basement to roof is approximately forty feet. Two kinds of windows were used. Five large windows, 8 feet by 16 feet in size, are made of thermopane. The outside glass of these windows is sandblasted, while the inside glass is clear. In addition, there are six sandblasted, storm-sashed windows, 4 feet by 8 feet in size.

The basement contains three large high pressure sand and gravel filters, chlorinating equipment, alum and soda ash feeders and a water heater.

The building is equipped with the most modern features, achieving utility combined with beauty. It has a complete climate control device which brings fresh, filtered and warmed air into the ceiling plenum chambers. This air is forced through the acoustic aluminum ceiling perforations into the swim room.

The pool itself has twelve fresh filtered water in-

lets, two main outlets and eleven underwater lights. Overhead lights and a public address system are recessed in the ceiling. The depth of the pool ranges from 3 feet, 6 inches to 9 feet, 6 inches. Its overall size is 75 feet by 30 feet and it holds approximately 90,000 gallons of water. This supply is completely refiltered and recirculated every six to eight hours.

Color Scheme of the Pool

A black and white photograph does not do justice to the delightfully warm and beautiful colors of the building interior. Ceramic tile of light seasplash green was used for the construction of the pool. Line, distance and depth-markings are of dark seasplash green. Runways, installed completely around the pool, are of ceramic tile in variegated sandstone color and pattern. All lower walls are of a stock-bond structural tile in light green and of concrete block stone painted a rose color.

The dressing rooms are furnished with a wire mesh, drying basket locker system. Adequate provisions have been made for the following future plans: a balcony seating 500 spectators; an office and a supply room; additional dressing rooms, toilets, showers and a steam room.

All Kinds of Equipment

At the swimming pool there is all the vital and valuable equipment needed for fun, recreation and learning in the water. It has a one-meter aluminum diving board whose installation makes possible the future addition of a three-meter board. Two water basketball goals are built into the pool. Other equipment includes the following: a 15-foot aluminum canoe complete for paddling, rowing and sailing; a 14-foot surf-paddleboard; four ladders; ring buoys, torpedo buoys and shepherd crooks for safety; kickboards, waterwings, diving bricks and diving discs for skill practice; a lifeline for the pool division; racing lines for the five racing lanes; swim fins and underwater glasses.

The new swimming pool will enable Concordia students to take nationally certified American Red Cross courses in swimming and water safety. Every student at Concordia will participate in these courses. Students will be enrolled as beginner, intermediate, swimmer, advanced swimmer or senior life savers.

Concordia's new swimming schedule calls for sixteen instruction classes, 50 minutes long, per week; ten free practice sessions of 45 minutes each per week; a two-hour senior life-saving class every Saturday morning; and four one-hour recreational fun swims every Saturday afternoon.

On Saturday and Sunday evenings mixed social splash parties are held. Individual and group swims for the faculty and other school personnel are held on Wednesday evenings. Plans for the future have already been made to include swim meets and swim relays on an intramural and varsity level, as well as water carnivals.

Comfortable and modern furnishings contribute to the well being of the boys living in Pritzlaff Hall. The building is an L-shaped structure and consists of three units.

The first floor lounge of the dormitory continues the modern motif of the interior decoration. Deep, upholstered chairs create a relaxed environment for the students.

Background of the Planning

Before construction of the swimming pool building was authorized, Coach Ackmann made a thorough

study of swimming pool construction and maintenance. Architects, contractors, supervisors and inspectors expressed their amazement at the thorough and comprehensive knowledge he displayed in regard to every detail and individual item involved in the numerous planning discussions.

With this expert possession and utilization of facts Coach Ackmann (recently appointed dean of students) was able to initiate and implement a project which is somewhat unusual among ministerial schools. Tribute is also given to Concordia's president, the Reverend Walter W. Stuenkel, for his enthusiastic administrative and personal support.

The New Dormitory

Concordia's newest dormitory, Pritzlaff Hall, is an L-shaped structure consisting of three units. Unit A was built several years ago at a cost of $200,000. The latest units, B and C, comprising the larger section of the building, were constructed at a cost of $400,000. Edgar A. Stubenrauch and Associates of Sheboygan, Wisconsin, were the architects.

The entire building provides accommodations for 165 persons. Students live in suites of rooms consisting of a bedroom for four persons adjoined on either side by a study room for two. In addition to student living rooms, the building contains a beautiful first floor lounge, three guest rooms (also on the first floor) and a basement student union room.

The new building is named after John and Fred Pritzlaff, father and son, who were members of the college board for many years. Edward Pritzlaff, a son of Fred, has been a member of the college board for more than twenty-five years.

What the New Buildings Mean

The completion of Pritzlaff Hall and of the new swimming pool has done more than provide Concordia's students with new housing facilities and an enlarged program for social and athletic development. These buildings have become symbols of the ingredients essential for true educational progress: alertness to change; scrutiny of new means and methods; determination to make the best available; and the ability to bring plans to fruition and fulfillment.

Concordia College does not pretend to have always met the requirements imposed by these high ideals but, after seventy-five years of truly marvelous divine blessings, we are greatly encouraged to keep on trying.

A snack bar is maintained as part of the facilities to be found in the basement student union of Pritzlaff Hall.

THREE-IN-ONE ATHLETIC FACILITIES FOR THE UNIVERSITY OF CONNECTICUT

by GERALDINE B. NOVOTNY

Assistant Editor, Division of Communications, University of Connecticut, Storrs, Connecticut

Miss Novotny has a B.A. degree from the University of Wisconsin and an M.S. from Boston University. She was a departmental assistant at the University of Connecticut's division of publications and became an assistant editor there in 1950. From 1943 to 1945 Miss Novotny was a member of the U.S. Marine Corps Women's Reserve, Marine Corps Base, San Diego, California.

THE red brick Physical Education Building and Field House at the University of Connecticut are the result of long, careful planning, which has taken into consideration not only the needs of the university but the experience in construction of similar facilities both locally and on other campuses.

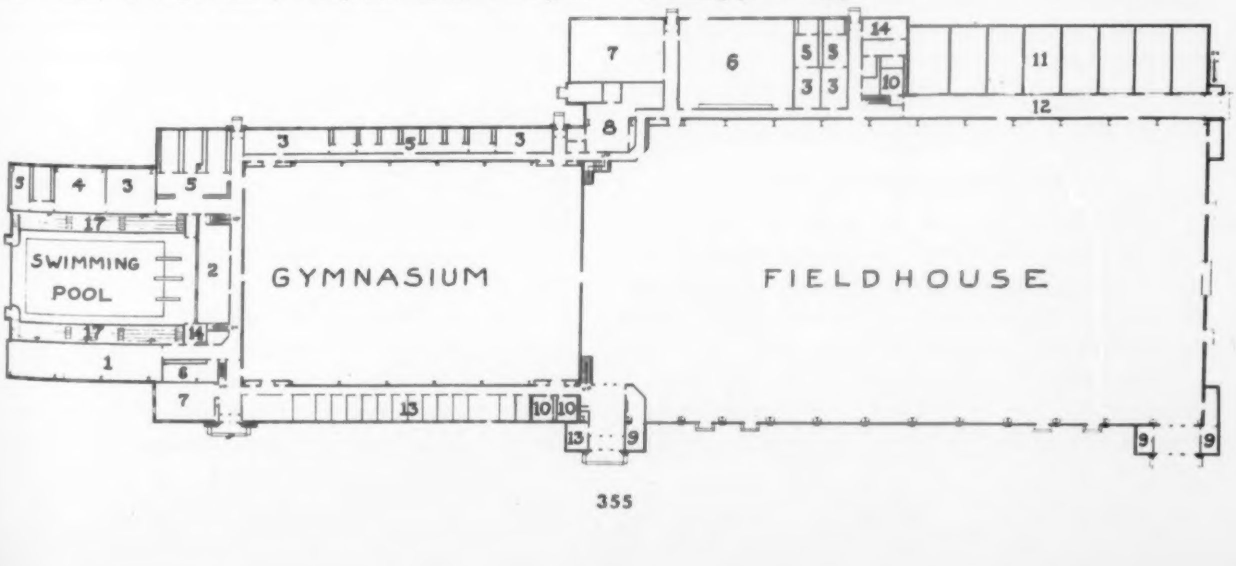
Plans for the design of the building were started before World War II by E. George Van Bibber, director of the School of Physical Education, J. O. Christian, director of the Division of Intercollegiate Athletics and Frederic C. Teich, Hartford, Connecticut, an architect who has designed a number of other university buildings on the main campus at Storrs.

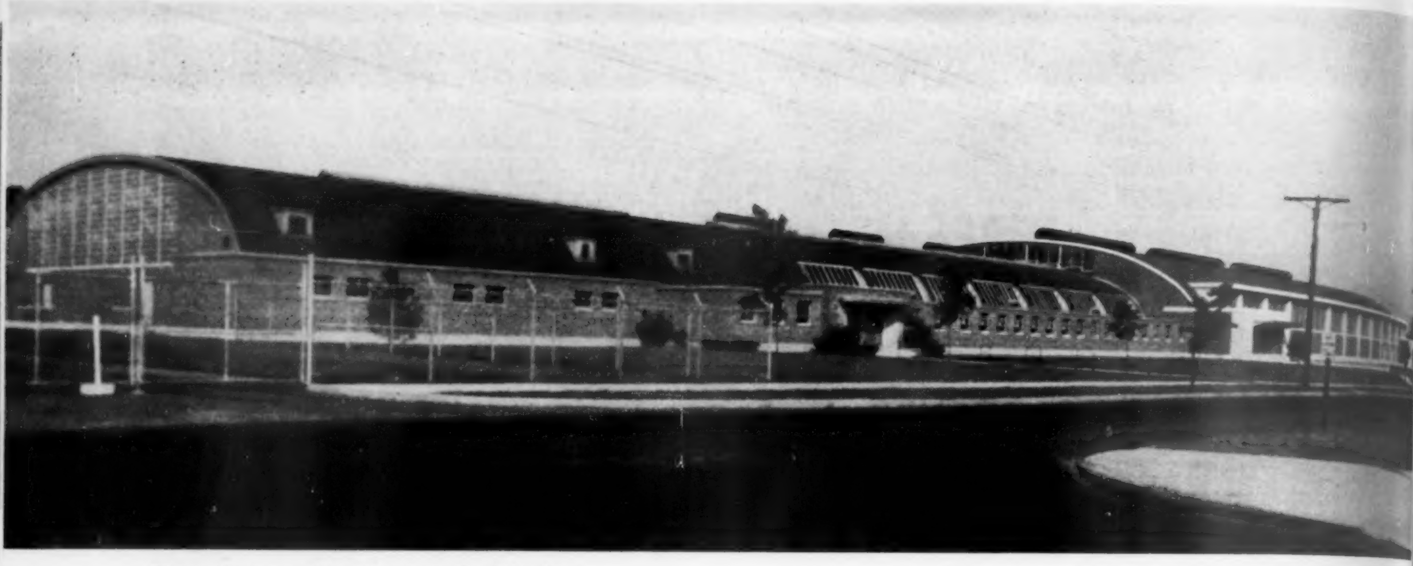
Actual construction of the Physical Education Building was delayed, however, as a result of the scarcity of construction materials during and after the war.

The indoor athletic facilities are housed in three connected sections: the gymnasium and pool, which comprise the Physical Education Building, and the Field House. Construction of the gymnasium and pool sections was completed in 1948 at the contract price of $846,000. The Field House, which is under direction of the Division of Intercollegiate Athletics, was completed in December, 1954, at a contract price of $930,000.

Facilities of the pool and gymnasium are used for all men's activities in physical education, athletics and

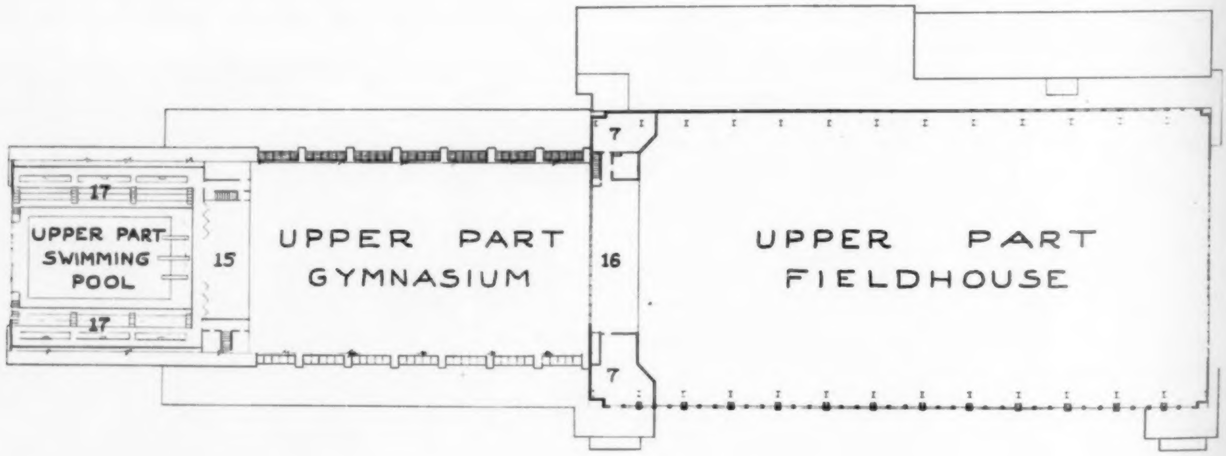
Areas of the new athletic facilities are: 1-4. locker rooms, 5. showers and drying rooms, 6. storage, 7. lecture rooms, 8. trainers' rooms, 9. ticket offices, 10. public toilets, 11. squash courts, 12. squash court spectators, 13. offices, 14. coaches' rooms, 15. boxing and wrestling, 16. field house balcony, 17. swimming pool seating.





The swimming pool section is at the left, the gymnasium and field house are adjacent. The original planning for the Physical Education Building and Field House was begun before World War II. Participating in this planning were E. George Van Bibber, director of the School of Physical Education, J. O. Christian, director of the Division of Intercollegiate Athletics and Frederic C. Teich, architect.

The upper floor areas of the combination building house two lecture rooms (7), the boxing and wrestling section (15), the field house balcony (16) and seating for the swimming pool spectators (17). The mezzanine balcony is used for instruction as well as for intercollegiate athletic practice.



intramural sports. Physical education and athletic activities for men and women and the ROTC program were previously held in Hawley Armory which is now used for required intramural and professional program activities for women students.

The Gymnasium Section

The gymnasium, with its mezzanine balcony, is used for instruction as well as for intercollegiate athletic practice. The basketball squad uses the courts of the gym for practice, but actual games are played in the Field House on a portable birch floor.

The main floor area of the gymnasium section, measuring 110 feet by 176 feet, wall to wall, contains three 94 feet by 54 feet basketball courts, six badminton courts, five volleyball courts, four single wall handball courts, a mezzanine balcony for wrestling and fencing, tumbling and other activities, a weight room and ample equipment for gymnastics and tumbling.

The floor of the gymnasium is maple wood on sleepers over a waterproofed concrete slab. The finished floor is tongue and groove hard maple, laid over a 1⅛-inch squared edge subfloor nailed to sleepers anchored onto the concrete slab. Subfloor and sleepers are treated with wood preservative, and the air spaces under the floor are ventilated at the walls.

The floor of the boxing and wrestling area on the mezzanine balcony is also maple, with a wire mesh screen on the gymnasium side and folding doors on the pool side. Walled off from the gymnasium proper

The main floor of the gymnasium measures 110 feet by 176 feet, wall to wall. The construction is maple wood on sleepers over a waterproofed concrete slab. The finished floor is tongue and groove hard maple.

are various facilities. On the east side are: a classroom, foyer, staff offices and toilet rooms.

In addition, on the west side of the gym a separate unit for student and faculty use consists of a locker room and shower for faculty and staff and three varsity locker rooms with 20 shower heads in five compartments of four shower heads each. Floors of toilets, shower and drying rooms, as well as those of entrance vestibules and lobbies, are terrazzo. Other floors in general are granolithic.

Natural lighting is provided by two rows of low curb roof skylights on each side of the center ridge ventilators, and by seven groups (on each side) of special type skylights recessed into the lower portion of the curved roof. These skylights are glazed with actinic heat absorbing corrugated wired glass. Offices and other one story areas are lighted by steel sash and glass block panels. The ridge ventilators have electrically operated dampers with push button, remote control.

The Pool Section

The pool, with a spectator capacity of 540, is used for instruction, free swimming, for intercollegiate swimming practice and meets. An additional 275 bleacher seats may be erected on the balcony, increasing the total pool spectator space to 815 when the folding doors which separate this area from the pool are opened.

Pool seating consists of five tiers on each side, starting behind the dwarf wall of the pool deck. The seats are laid out to make practically the full width of the pool visible from all seats. Seats are wood, supported by steel brackets set in the face of concrete risers. A steel pipe rail is located at each tier. Aisles and risers are concrete, with non-slip metal nosings at the steps.

Important sanitary and safety provisions have been carefully designed. Routes of the swimmers entering the pool lead through showers and a foot bath. The pool is equipped with adequate filtering and sterilizing equipment as well as facilities for inspection observation.

The pool itself is 42 feet by 75 feet, standard size for competitive records, and from 4 feet to 12 feet, 6 inches in depth. The bottom and sides of the pool are poured reinforced concrete, waterproofed inside by a plaster coat of waterproofing. The pool lining is vitrified porcelain ceramic mosaic tile, white on the bottom and pale green at the sides, with lane and depth markings and ladder recesses in black. "Kick-off" areas at the ends are abrasive non-slip tile.

The gutter around the pool is semi-recessed and tiled with its back surface shaped to turn waves down into the gutter and not back into the pool. The curb edge above the gutter is non-slip tile, which is also used on the surface of the starting platform.

Ladders are wholly recessed into the side walls, with steel reinforced tile step rungs and stainless steel hand grips above the deck edge. Rope rings are recessed flush. The only projections into the pool are the handholds for the backstroke start.

Underwater Lighting

Underwater lights, spaced about 11 feet apart at the long sides of the pool, are used for special lighting effects when all overhead lights are not being used. Underwater glass vision panels on each side of the pool, at the deep end, are provided for teaching purposes, enabling the coach to watch underwater diving and swimming form.

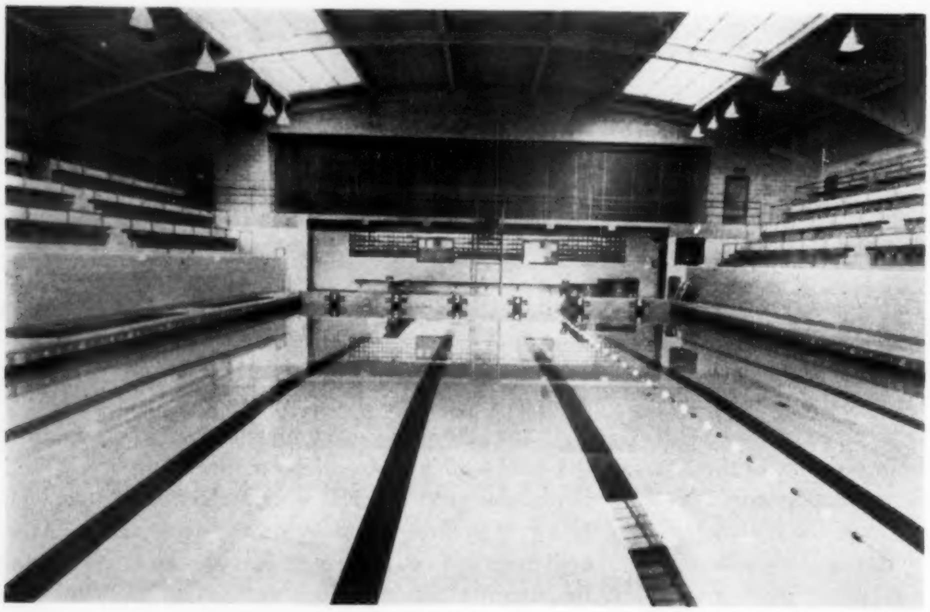
The deck area about the pool is five feet wide along two sides, eight feet and eight inches at the shallow end, and sixteen feet at the diving end. The floor of the deck is terrazzo with non-slip granules, pitched back from the non-slip tile pool edge to a terrazzo-lined drain along the back wall of the deck. This deck is warmed by radiant heating coils in fill under the terrazzo. Walls around the deck are glazed tile blocks, and passage from the deck to showers and drying rooms has a full width terrazzo lined sunken foot bath.

The deep end of the pool has two one-meter and one three-meter standard diving boards with pipe mounts, rails and ladders. The sides are provided with removable stainless steel posts for cross line marking, set in sockets on the deck edge.

Facilities in the pool section, which serve as a base for required educational and intramural programs, also include: a general locker room with 1,151 lockers, two large shower rooms with 27 shower heads, and adequate drying and toilet rooms. Lockers are assigned to students who use the building for the entire school year.

Natural lighting is provided by two rows of double glazed skylights along the roof, and a large area of glass block panels in the south gable end. The roof framing of this section is furred and metal lathed over a vapor seal course. Metal lath is covered with a waterproofed sprayed-on acoustical material, giving a one hour fire rating and 0.80 noise reduction. Space between the roof deck is warmed and ventilated.

The pool has a capacity of approximately 179,000 gallons of water, which is recirculated to provide a complete turnover in eight hours and can be speeded up to a six-hour cycle. The water is filtered by a battery of three 84-inch pressure tanks using sand and gravel filter media. The system is complete with recirculating pumps, chlorinator, coagulating feeder, ammoniator, hair and lint catchers, make-up tank, heater and controls. A suction cleaning system for the pool is also provided. This equipment is housed in the mechanical room, adjacent to the deep end of the swimming pool.

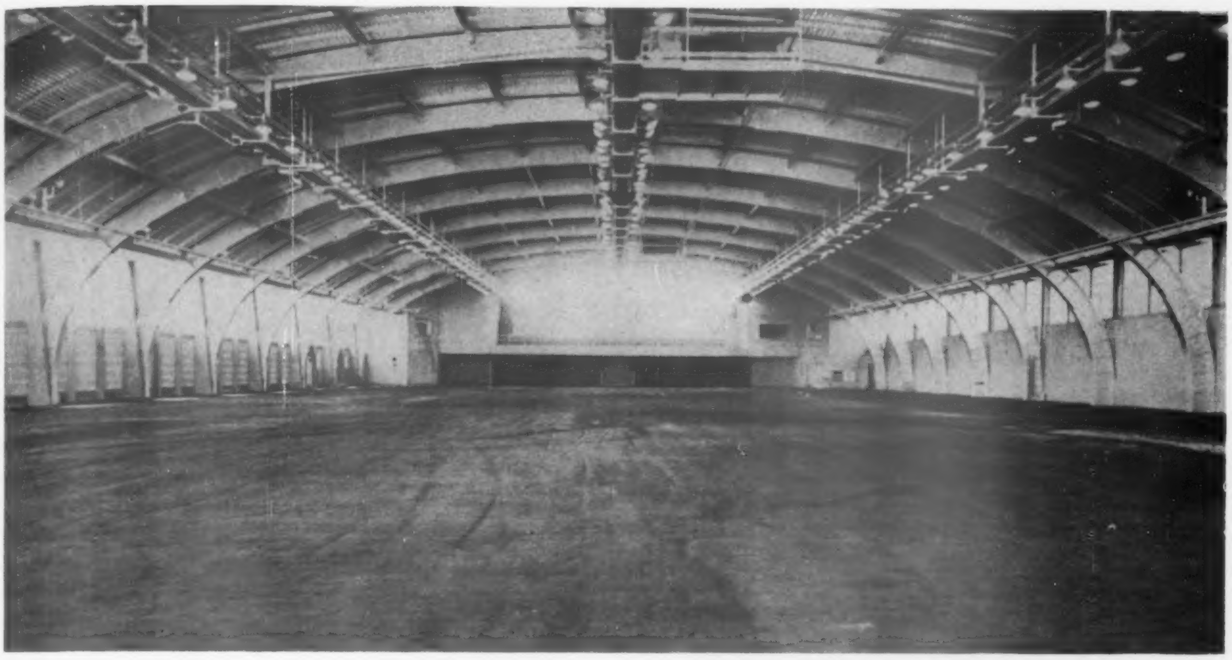


The swimming pool measures 42 feet by 75 feet and is from four feet to twelve feet, six inches deep. The pool has a capacity of approximately 179,000 gallons of water.

The Field House Section

The Field House is used for basketball and other games and many nonathletic indoor events. Commencement exercises were held here in June, 1954. Among its facilities are: an eighth of a mile track and space for indoor practice for football, soccer, basketball and track.

The main open floor area measures 148 feet by 325 feet with 125 feet by 28 feet of balcony area, two



The field house is used for basketball, other games and many nonathletic indoor events. The commencement exercises for the university have also been held here.

classrooms and a laboratory on the mezzanine floor at one end. The floor of the open area is a compacted mixture of loam and clay, over a packed gravel fill, which eliminates the raising of dust. Roof framing and decking are left exposed and painted.

Foundations are provided for setting up portable basketball platform floors and for folding bleachers, to be used in intercollegiate basketball games and other events held at the field house. The seating capacity is approximately 5,000. A complete public address system is provided for the main field house as well as standard scoreboard equipment.

Natural lighting is obtained through the use of steel sash in continuous dormers and an exposed gable end. Artificial lighting is supplied by rows of flood lights on three continuous steel catwalks hung from the roof framing.

A One Story Extension

A one story extension of the Field House, measuring 350 feet by 52 feet with a flat roof, includes a supply room; lecture room; corridors; training room; toilets and locker and shower rooms for home and visiting teams, as well as a similar suite for coaches and officials. This section also has eight squash courts which extend down the main floor level, with stairs and basement corridor for access, and viewing windows for spectators in the main floor corridor. The squash courts have a wall and floors of hard maple, on special furring to provide additional resiliency.

The training room, which was recently enlarged, includes an area for various types of physical therapy equipment to treat possible injuries. The equipment consists of six treatment tables, five infra red lamps, an ultra violet lamp, two whirlpools, an electric cabinet bath, a refrigerator for cold packs, a special bath for hot packs, a short wave diathermy machine and an inner muscle vibrator.

Floors of the vestibules and lobbies in this section are quarry tile; in lecture rooms and laboratory, asphalt tile; in toilets, showers and drying rooms, ceramic tile; utility rooms, granolithic; and the balcony, maple.

General Construction Details

For the most part, the long red brick structure is one story high with mezzanines. There are no basement rooms except the squash courts and a mechanical room (not shown on floor plans), approximately 40 feet by 54 feet adjacent to the deep end of the swimming pool. There is also a service tunnel in the basement around three sides of the swimming pool. Spaces under the pool seating accommodate piping, duct work, etc.

The mechanical room houses all the equipment necessary in connection with the swimming pool. A 1,430-gallon storage tank with a 1,000 g.p.h. steam heating unit provides hot water for showers, toilets, etc. Equipment for heating and ventilating all sections by supply and exhaust fans, steam heaters and duct work provides heated fresh or recirculated air, and complete ventilation. All heating units, including water heating, are supplied with steam from the university's central boiler plant.

The footings and foundations are poured concrete. Subgrade rooms or spaces have concrete walls. Main

floors (except the field house) are reinforced concrete slabs on earth and drainage fill, with varying surface finishes. Floors of the mezzanine rooms are suspended reinforced concrete slabs.

Exterior masonry walls consist in general of concrete blocks with selected common red brick exterior facing. Trim at the two main entrances is granite.

Roof Construction Details

The original plans called for peaked roof construction to harmonize with the architecture of surrounding university buildings. Due to skyrocketing costs, peaked roof construction was abandoned for arched roof construction, which proved more economical and which has worked out well from every practical standpoint. The arched roofs are supported by built-up steel rigid frames, giving clear span from wall to wall. These carry steel purlins and rafters with steel roof decking, covered with vapor seal course and insulation. The finished roof surface is built-up asphalt asbestos felt roofing with a mineral surfaced cap sheet.

Main roof framing and decking are left exposed and painted except in the swimming pool section. The low flat roof decks are either a metal-edged gypsum plank on steel joists or reinforced concrete slabs, with built-up roofing and insulation.

The interior design was planned with emphasis on a useful and efficient layout, sanitation, cleanliness and a light and airy atmosphere. Interior walls are mostly exposed sand cement blocks, except where glazed terra cotta blocks are used in toilets and similar rooms to provide a sanitary finish.

Proximity of Athletic Areas

Most of the university's athletic buildings and facilities are located in one area on the campus and form a compact unit. The value of the Physical Education Building and Field House is enhanced by their proximity to the new concrete stadium, located about 200 feet southwest of the building. The stadium provides, with bleachers, room for 15,000 spectators.

A stadium facilities building, adjoining the new structure, provides public toilet facilities, locker, shower and toilet rooms for two squads; an equipment room; training room; lecture room; an office, showers and toilets for coaches and officials.

This field house corridor has viewing openings to the squash courts. Spectators may watch the activities on the squash courts from here.

The Health and Physical Education Building and Natatorium at Northwestern State College, Alva, Oklahoma, were designed by architect Dow Gumerson of Enid. The structures adjoin each other and together constitute a compact health and physical education unit.

NORTHWESTERN STATE COLLEGE BUILDS A NATATORIUM

by W. D. NEWBY

Director of Athletics, Northwestern State College, Alva, Oklahoma

Mr. Newby is an alumnus of Friends University and has a graduate degree from the University of Michigan. He was an athletic coach and instructor in high schools and Oklahoma state colleges from 1924 to 1943. He then became the director of athletics at Northwestern State College. During World War II, Mr. Newby was the physical training director of the 92nd College Training Detachment (air crew).

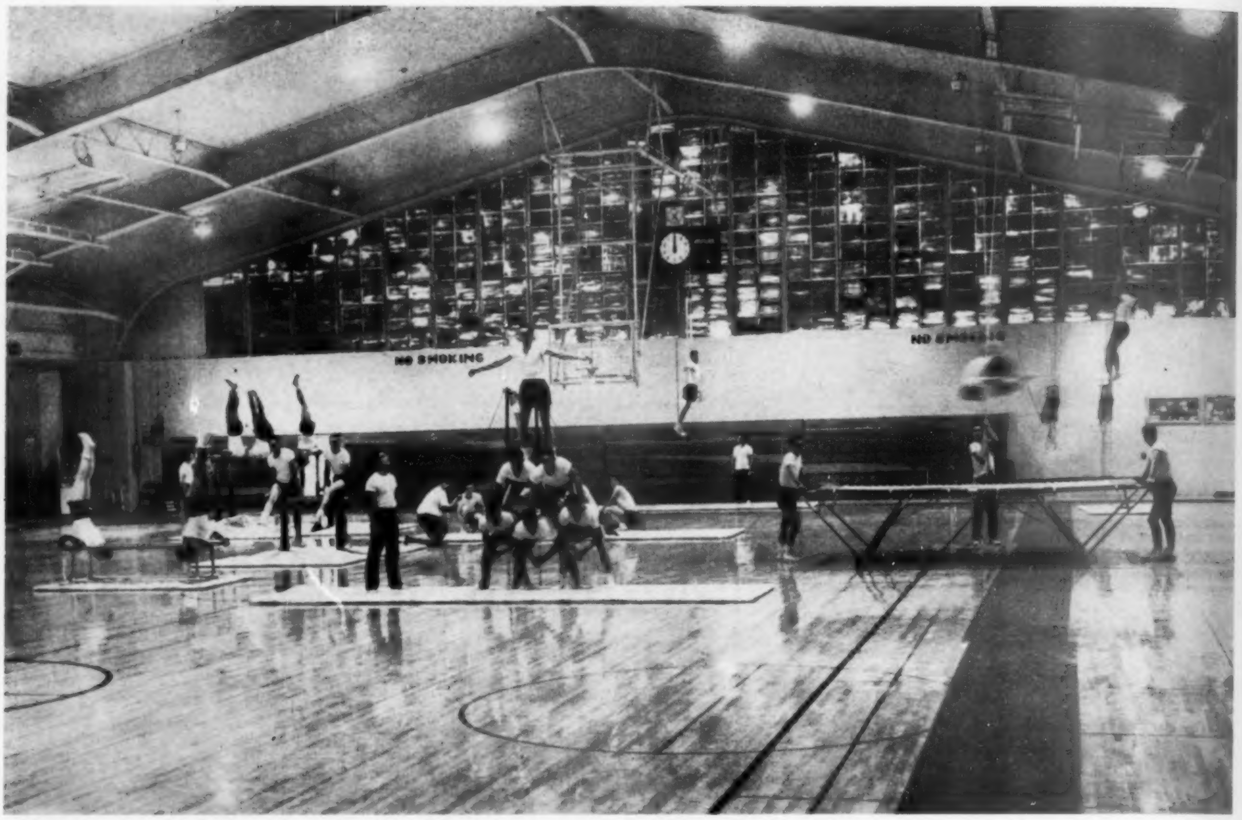
SHORTLY after the termination of World War II our American veterans, their varied military careers behind them, swamped the college campuses of their choice. It may be recalled how the earnestness and sincerity of these young people became an inspirational stimulus to many college administrators who realized that their existing campus facilities would have to undergo expansion programs of one sort or another.

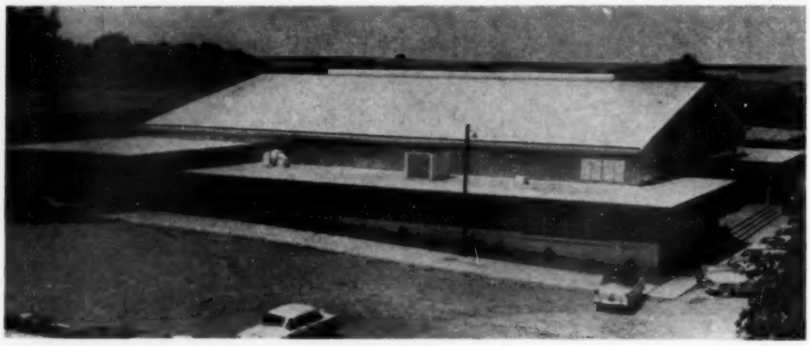
It is with a sense of pride that we now recognize fully the foresight shown then by the Board of Regents of our Oklahoma state colleges and the enthusiasm displayed by our local administrative staff at Northwestern State College in support of expansion. The Board of Regents realized that the existing facilities at Northwestern State College were totally inadequate. Of course, as is often the case, the funds needed to finance the type of complete new plant deemed necessary were unavailable. However, authority was granted for the construction of the main portion of a Health and Physical Education Building.

This building was formally dedicated in November of 1953 and was built at a total cost of $400,000. The original structure did not include a natatorium. We were assured by our regents, though, that such a structure would be forthcoming as soon as additional funds were available. This assurance and promise became a reality during 1954. As a result, our small northwestern Oklahoma college now has one of the best equipped and most functional health and physical education units in the entire Midwest area.

The original fieldhouse-gymnasium was centrally located on our campus and was designed to permit the addition of the natatorium. The structure was designed by Mr. Dow Gumerson, a member of the American Institute of Architects. Mr. Gumerson was also retained to design the natatorium addition. Quite naturally, the same architectural lines of design were carried out to conform with those of the first building. The new addition adjoins the existing Health and Physical Education Building and access to the natatorium is from the men's locker rooms.

The swimming pool is 60 feet, one inch by 28 feet





In the spacious gymnasium of Northwestern State College many activities may be carried on at the same time. The original structure, completed in 1953, was followed a year later by the construction of the natatorium.

in size. The water depths are three feet, six inches at the shallow end to five feet, six inches at the midpoint and nine feet, six inches at its maximum depth. At the springboard end the pool is seven feet deep. The equipment includes one one-meter springboard and a lifeguard chair with additional lifesaving apparatus. There are four plastic skydomes over the diving area.

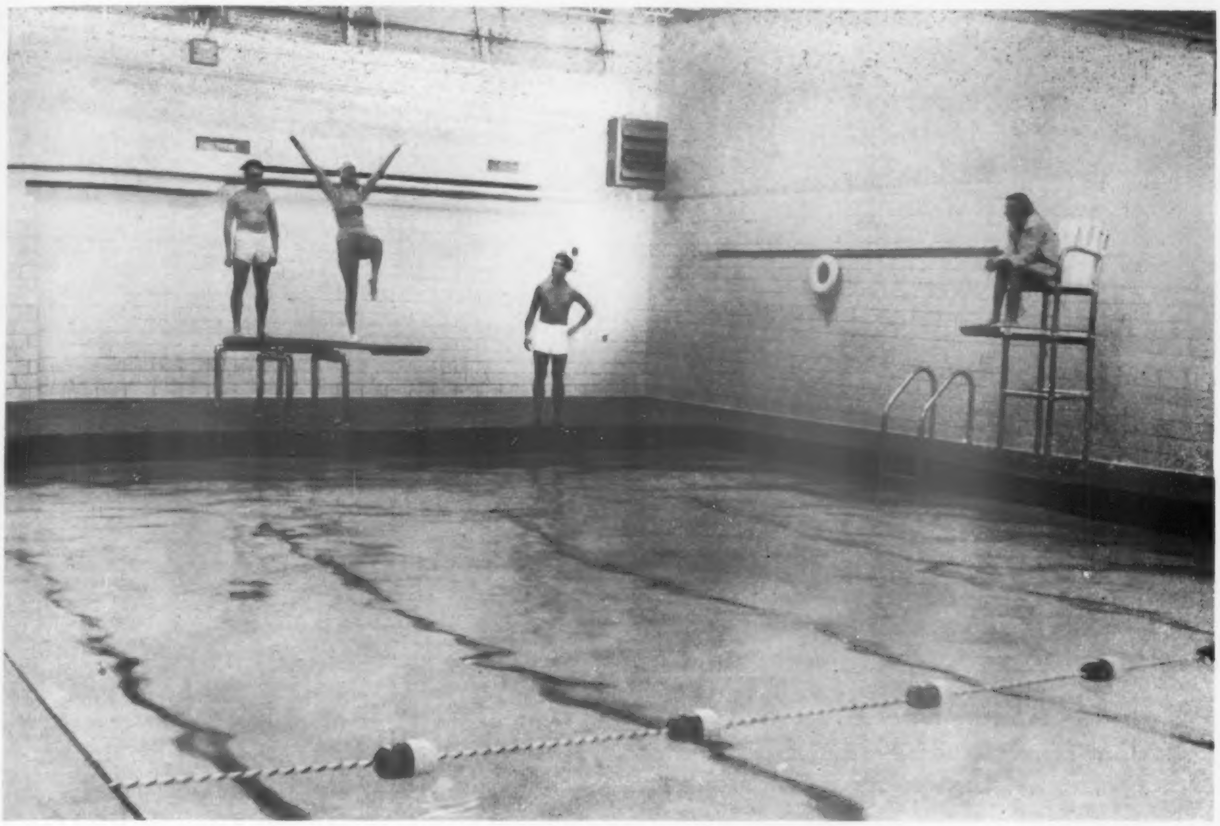
Women's locker room facilities, with an exterior entrance, are located in the front part of the building. The women's area contains entries with a foyer, a locker room with forty-two full length lockers, adequate toilet facilities, a shower with twenty shower heads and two private dressing cubicles, a drying room area with hair drying equipment and an access door to the pool decks.

The floors of the deck area are heated by steam pipes placed beneath the anti-slip quarry tile flooring. The filter room is located under the springboard end of the deck. It contains three 60-inch diameter sand and gravel filters and a heat exchanger for heating the pool water. The filter room has a separate outside entrance.

Exterior Details

The exterior walls of the natatorium are rubbed monolithic concrete, with high, aluminum awning-type windows in the women's locker room. Clerestory windows provide light for the springboard area. There is a flat concrete roof slab over the women's locker area, and a concrete slab with a clear span of 38 feet on exposed steel joist over the pool.

All interior partitions and walls in the locker area are faced with buff-colored glazed structural tile. Interior walls in the pool area have glazed structural tile, flesh pink in color, to a height of eight feet, with rubbed concrete above the tile. The pool tank is floored and walled with ceramic white tile and the lanes and gut-



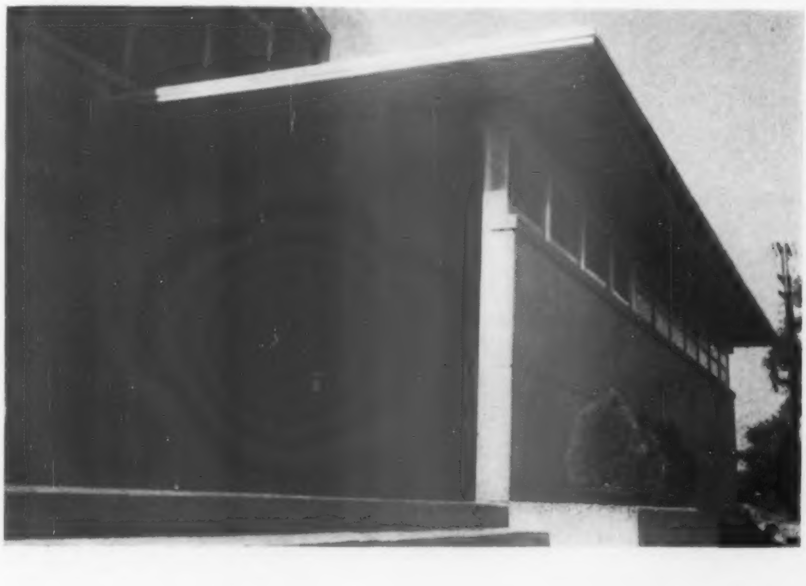
The swimming pool is 9 feet, 6 inches deep at its maximum depth and is 7 feet deep at the springboard end. The pool tank has walls and a floor of ceramic white tile with gutters marked with black tile.

ters are marked with black tile. All decks are covered with six-inch square red quarry tile.

The Building Dimensions

The overall dimensions of the building are 112 feet long by 46 feet wide. The one story section, over the women's locker room and the shallow end of the pool, is ten feet high. The two story portion, over the deep end of the pool and diving area, is seventeen feet high. The total cost of the natatorium amounted to $104,872.

Immediately upon completion of the new natatorium, classes for the usual program of aquatic activities were organized, with special emphasis upon instruction in beginning, intermediate, advanced swimming and water safety. The pool is under the care and supervision of a full-time operator and maintenance supervisor. The operator gives considerable time to those



A concrete plaza extends along the north side of the fieldhouse structure and contains two four-door exits.

The main entranceway to the Health and Physical Education Building at Northwestern State College, Alva, houses facilities for ticket sales to athletic events, a snack bar, trophy case and planter boxes.

of our students who desire training in the techniques of pool operation.

Recreational Activities

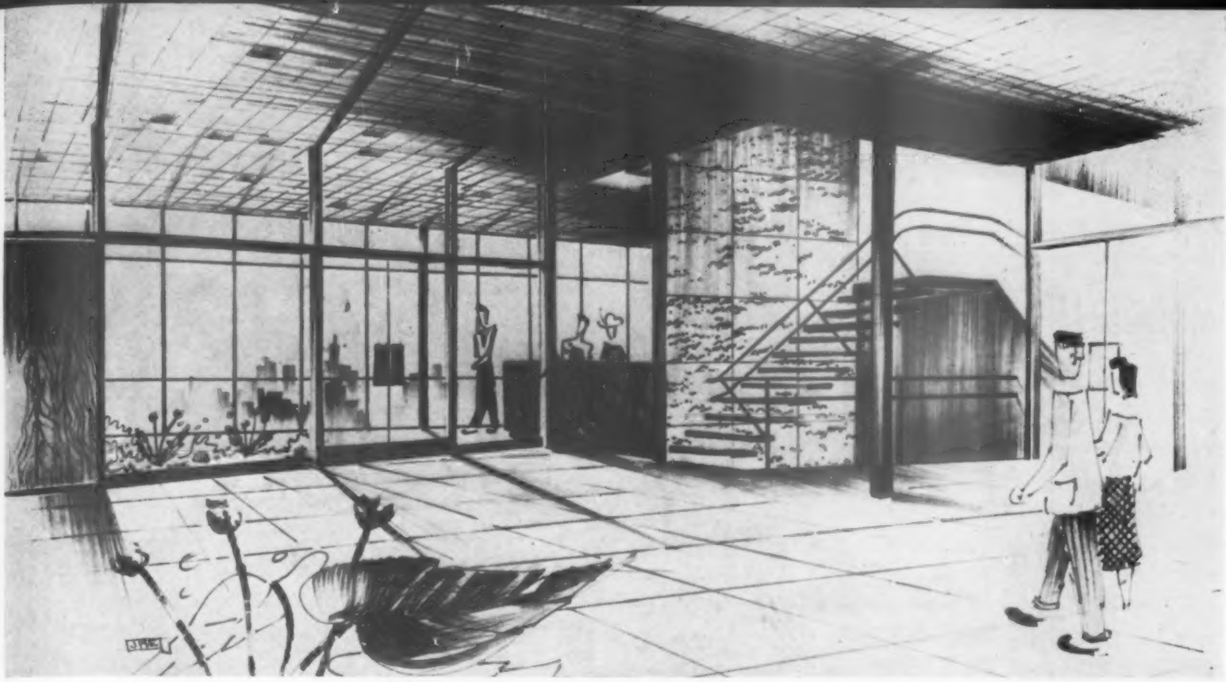
In addition to seven classes for college students in aquatic proficiency, the pool is regularly open for voluntary coeducational recreational activities. Various staff members in turn serve as certified lifeguards. The opportunity for informal recreation has, of course, added a great deal to the attractiveness of campus social life, particularly for those living in the student resident halls.

Swimming instructors were given administrative approval for the organization of a program of week-end private instruction for all age groups in the community. Any and all who were interested in acquiring or improving their water skills have attended these sessions. They have proved to be a popular and effective means of cultivating good public relations in our community.

A weekly activity schedule is prepared by the pool director each week to insure the equal use of the pool by the many groups who so desire. Copies of the schedule are posted in various locations for all concerned to consult. This type of planning is very much appreciated by the maintenance staff who have the responsibility of keeping the pool area and the water conditions hygienically safe, as well as clean and attractive.

Special Training Provided

Our pool director, who has been designated by the American Red Cross as a county water safety instructor, has recently conducted a special course for the training of lifeguard personnel. The class was composed not only of college students, but of all those in the community who desired instruction in this phase of water safety. During the summer, a similar course for swimming instructors was offered by the pool director. Those who qualified were issued the usual American Red Cross credentials.



The lobby of the new Student Life Building for the New Jersey State Teachers College at Montclair has glass walls facing the magnificent view of the New York City skyline in the distance.

AT MONTCLAIR COLLEGE— A TRIPLE FACILITY STUDENT LIFE BUILDING

by E. DeALTON PARTRIDGE

President, Montclair State Teachers College, Upper Montclair, New Jersey

A member of the faculty at the State Teachers College since 1937, Dr. Partridge served as dean of instruction for four years prior to being named president in 1951. He received his A.B. degree from Brigham Young University and his Ph.D. from Columbia University. During World War II he served with the U.S. Navy as a lieutenant commander.

and EMIL A. SCHMIDLIN

Architect, East Orange, New Jersey

Emil A. Schmidlin began his architectural studies in Switzerland, where he was born. He studied further at Columbia University and the Beaux Arts Institute and began practicing architecture in New York and New Jersey in 1932. Since 1945 Mr. Schmidlin's work has been mostly institutional in character, namely, hospitals, civic centers and schools.

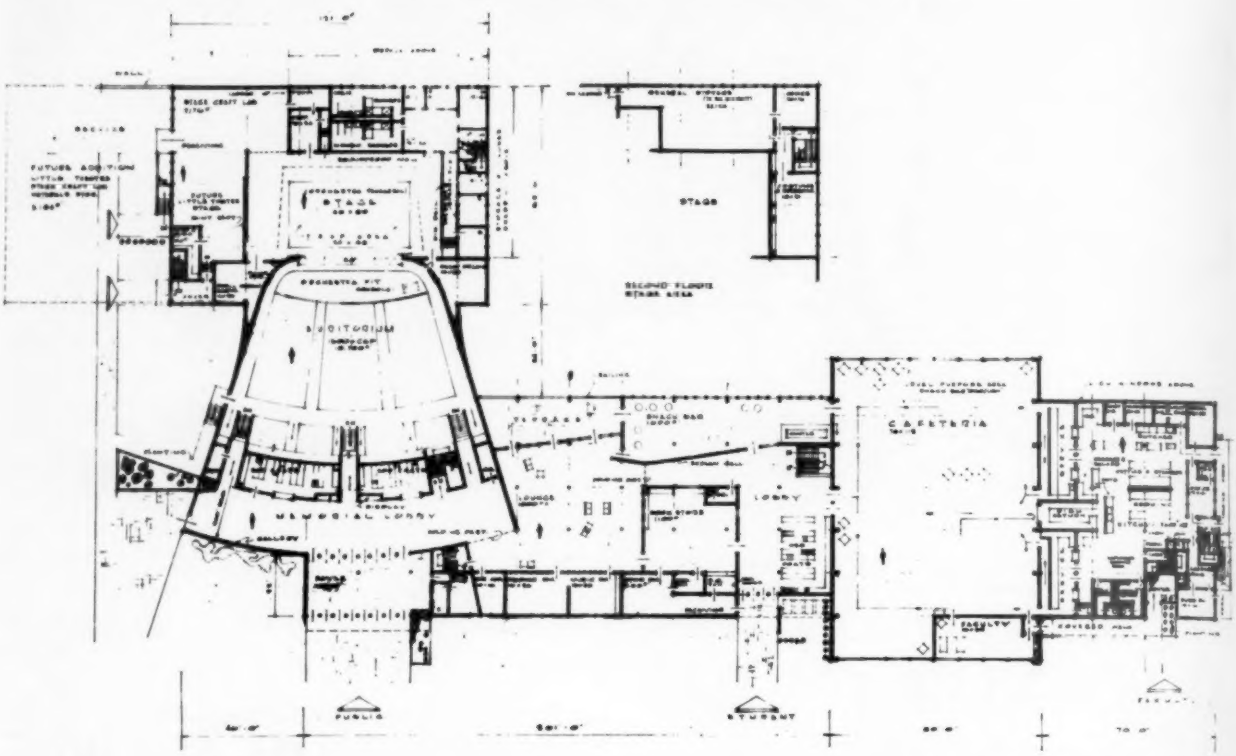
IN 1951 the people of New Jersey voted a fifteen million dollar bond issue to improve and enlarge the six State Teachers Colleges. The New Jersey State Board of Education announced a master plan in 1952 under which the bond issue money was to be spent. The master plan authorized the construction of six new buildings on the Montclair campus—two dormitories, a gym, a classroom building, an auditorium and a food service building.

In addition to the bond issue funds students, faculty, alumni and friends of the college had for some years been raising money for a student life building.

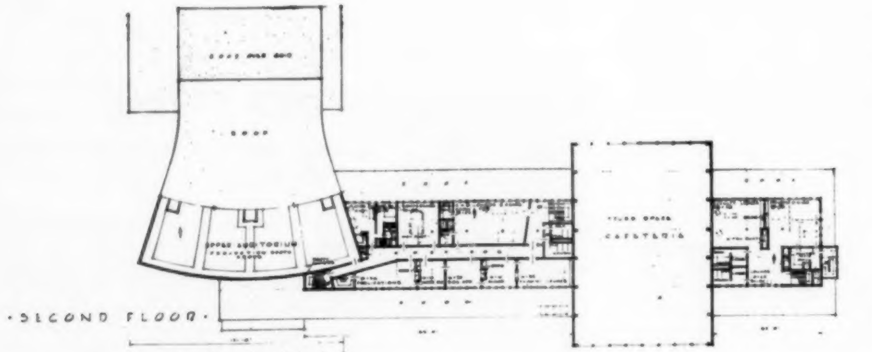
As planning for these new facilities progressed, it became apparent that there was a natural relationship between some of them that might make it profitable to consider a combination building. Combination buildings, although they may save money, can also limit programs unless the combinations have a natural, functional relationship. Some building units simply do not belong together.

Three of the buildings authorized at Montclair seemed to have such a natural relationship to each other—the auditorium, the food service building and the student life center. An auditorium, a dining hall and a student center could each justify some cubic footage for a lounge. Why not combine them and construct a lounge that would serve all three at the same time or separately, as needed? This would save funds and at the same time provide a larger single lounge area than could be justified if each building were constructed separately.

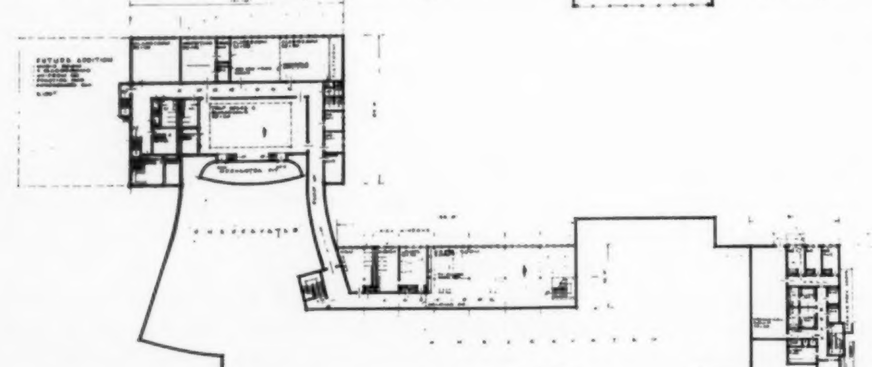
All three of the contemplated buildings would



On the first floor are the large auditorium and its auxiliary spaces, the lounge, bookstore, snack bar, lobby, the cafeteria, faculty room and kitchen areas.



A faculty lounge is located on the second floor, together with a private dining area, alumni rooms, the publications office and a conference room.



In the basement there are several classrooms, the orchestra pit, a large game room, locker rooms and an area for the mechanical equipment.

need toilet and restroom facilities. Why not combine them so that there would be persistent use and thereby save on cubic footage and expensive installations?

The advantages of combining such common facilities are quite obvious. There are certain disadvantages that are not quite so obvious. Great care must be taken to avoid combining the units so tightly that they can serve only one function at a time. If this happens there is either waste or confusion or both.

In examining the possible uses of the three proposed buildings, the demands upon common facilities seemed to complement rather than to compete with

each other. It is not likely, for example, that meals would be served at the same time that the auditorium is in use. The peak period for student activity facilities is in the late afternoon and early evening. Such use will not directly compete with the auditorium and the dining hall for the lounge and restroom areas.

In short, the auditorium, food service and student life buildings seemed to have a natural functional relationship to each other. The problem now was to plan the combination so that the facilities would be as adequate and versatile as possible. The problem of adequacy was more difficult than the problem of versatility.

The Auditorium Facilities

From the very beginning it was evident that sufficient funds were not available from the teachers college bond issue monies to construct and equip the type and size of auditorium that was really needed. A small theatre and a band rehearsal room are logical parts of a building of this kind, especially for a college that has both a music and a speech curriculum. As the planning progressed and the cubic foot estimates began to take shape, it became more and more evident that some badly needed facilities would have to be sacrificed. The problem then was to hold on to the vital areas and keep them from being so small and inadequate as to be a liability for generations to come.

Faculty, students and alumni all had an extensive hand in the planning of this combination building. It was generally agreed, early in the planning stages, that it would be better to build fewer facilities of a proper size than to cut everything down proportionately. Thus, a decision to sacrifice the little theatre seemed wiser than to cut other vital areas. Decisions like these were not easy to make, but it was felt that they were for the best.

As a result of these basic decisions it was necessary to plan the auditorium for multiple use. It was obvious from the beginning that the auditorium should be a place where students would gather regularly for assembly programs. In addition to this, it would have to serve as a rehearsal place for the choir, the orchestra and the band.

Because the speech department of the college would use the auditorium extensively it was decided that speech classrooms should be provided in the backstage area, as well as a scenery workshop and space for small speech conferences and interviews. Providing space for use only as dressing rooms was out of the question. Thus, the stage area was planned with dressing rooms that will serve two or three purposes.

They will be used during class hours for small conference groups in the speech department and for recording and play-backs where such methods are used for speech training. During the after school hours these rooms will be used for speech clinic sessions, providing privacy to patients coming to the college for special speech work. In the evenings the rooms will be available as dressing rooms.

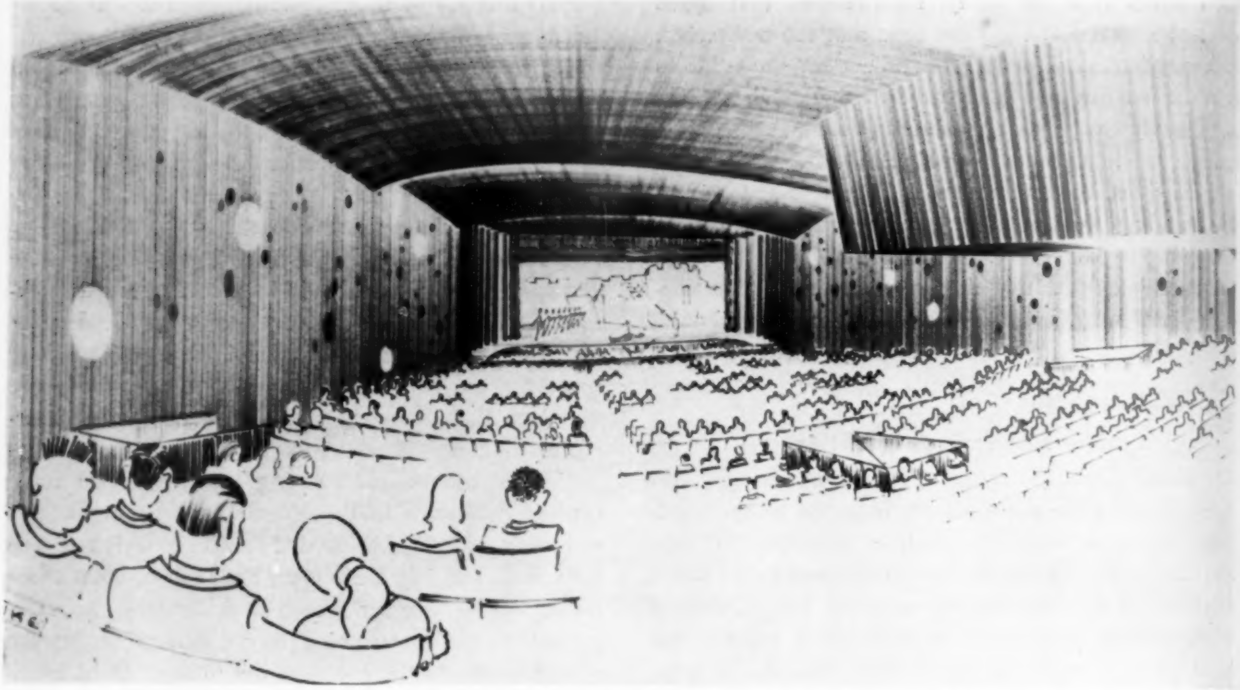
Use as a Recording Studio

The auditorium can be used as a recording studio for certain activities on the campus. The college has long had a tradition of accomplishment in the field of music, dramatics and television. In the auditorium high fidelity recordings can be made of music and other group performances.

When the decision to build an auditorium on the campus became known, friends of the college in surrounding communities decided to raise money to install a fine pipe organ. Space was included in the auditorium for this instrument.

It is already evident that the auditorium will be

The Memorial Lobby is adjacent to the auditorium and will feature wall displays. A coat check service is maintained for visitors to the auditorium.



It is already evident that the new auditorium will be the center of busy activities. The many cultural activities of the community, as well as of the college, mean that the auditorium will be in constant use during the year.

an extremely busy place. Montclair is a community with many cultural activities. There is an outstanding operetta club which produces two shows each year; a dramatics club has equally high standards. The New Jersey Symphony performs at least twice in the community each year. An air-conditioned auditorium in the beautiful setting of the college campus will serve all of these groups admirably.

Obviously, the needs of the college must be served first, but performances by any of these groups will be a real addition to the cultural life of the college. Indeed, college students have for many years past participated in these activities.

Planning the Snack Bar

As the student life combination building developed, it became evident that careful planning helped to expand the usability of limited facilities. The snack bar is a good example. In visits to other campuses where snack bars have been built recently, the common complaint was the inadequate size of the facility.

With this in mind the snack bar was placed adjacent to the dining hall. In between meal hours the seating facilities of the dining hall area can be used by snack bar patrons. This provision increases the potential of the snack bar tremendously.

Independent Use of Areas

Another important factor in planning the combination building was to insure that any one of the facilities could be operated independently, if necessary. Each component area is designed so that it can be used separately by a different group, at the same time that the other areas are similarly in use. Folding doors divide any areas as needed. Furthermore, there is an ample foyer in the auditorium if the lounge must be used separately. The adaptability of this combination building is extensive.

It is extremely important, in preparing young people to become teachers in modern society, that they have opportunities to carry on their social activities in wholesome surroundings. Heretofore, Montclair State Teachers College has been handicapped by an almost complete lack of such facilities. Class and student dances, receptions and dinners can now be held on campus in surroundings that compare with the most desirable in the metropolitan area.

Daily Use of the Building

During the day the Student Life Building will be the heart of the campus. It is here that students will purchase their books and supplies, pick up their mail, have light refreshments, relax with their friends. During the college day every student will come into this building.

In the afternoons and evenings the student government and publications office will be the center of activities for student leaders. The alumni offices will be the base of operation for this active organization and will bring graduates back to the campus constantly.

Special receptions in the lounge, followed by a meal in the dining hall, will be commonplace. Smaller

The cafeteria seats 600 students and 50 faculty members at a time. A snack bar is next to the dining hall and shares a common door.

parties can be served at the same time, either in the faculty lunchroom (which is used exclusively by the faculty for lunch only) or in the private dining rooms near the faculty lounge.

A word should be said here about the faculty lounge. Members of the faculty themselves raised money for this lounge. It is an attractive and rather ample area for the size faculty the college expects to have. However, even this area was planned so that the small private dining rooms adjacent to it could be used by non-faculty groups at the same time that the faculty was using the lounge. The lounge and the dining rooms together form a functional unit. In the evenings when the faculty would not be using the lounge it could be a reception area for private dinner parties. When the dining rooms are not being used as such they are available as additional faculty lounge space.

Another bit of realistic planning in connection with the Student Life Building has to do with the demonstration high school on campus. It was quite obvious in the planning stages that students in the demonstration high school would be using the student life center as a place to eat and for trips to the bookstore and snack bar. It seemed advisable, therefore, to provide specifically for this group so that they would not be using facilities that were planned for the college and alumni.

Private funds were raised by the parents of the students at College High School and a room was designated in the building as a kitchen and lounge area for College High School students. Under their own leadership, this room accommodates the kinds of activity that would naturally take them out of the areas used by college students.

The Hub of the Campus

The new building will be the hub of campus social and educational life. It will also serve a great civic need as a center for lectures, plays and group activities. Located on the edge of the cliffs, it overlooks a magnificent view of New York City. All major rooms in the building have been placed to take advantage of both the view and the cliffside site.

The plan of the new structure has placed the two major elements, the cafeteria and auditorium, at opposite ends connected by the multi-purpose social area. The central social facilities will be used in conjunction with the many varying activities of the cafeteria or auditorium.

The auditorium has a seating capacity of 1,000 persons, and is air-conditioned. It has full stage and projection room facilities so that legitimate theatre,

The student lounge has its own terrace which has a direct entrance to the snack bar.

The Auditorium, Food Service and Student Life Building at the State Teachers College of Montclair, New Jersey, Emil Schmidlin, architect, is a triple facility structure which takes advantage of the natural relationships of its main areas.

television, radio, concerts and lectures all can work under the best conditions. The latest sound and broadcast systems make it ideal for recording purposes. Seating has been designed as amphitheatre type, and the entrance into the center of the auditorium is from the lobby below.

An integral part of the stage area will be the shops, speech and English classrooms and offices, which will double in use as dressing rooms when needed.

The cafeteria will seat 600 students and 50 faculty members. The room will also be used for dances and other gatherings, and is provided with a complete sound system which may be interconnected with the auditorium. In addition, a private dining area is located on the second floor overlooking the view. Faculty lounges and meeting rooms complete this area.

The kitchen will be completely tiled, and will have a special aluminum acoustical ceiling which serves as an overall ventilation system.

The student center has a covered terrace which becomes part of the main lounge in pleasant weather, and connects with a lower terrace from the game room.

The building has been designed about a definite structural grid system of reinforced concrete for simplicity in use and construction. Exterior walls are brick and lightweight aluminum panels.

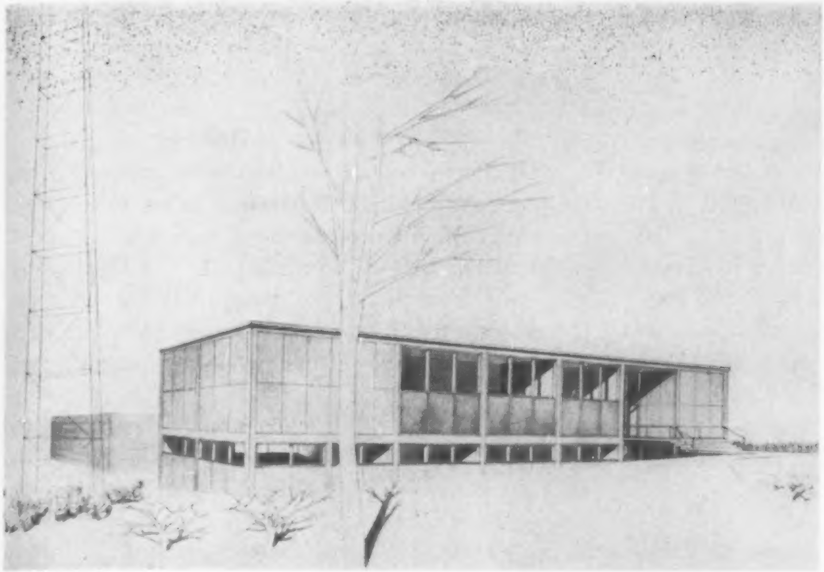
Many different textures and materials have been used for interior finishes to give an informal atmosphere of relaxation. In general, the ceilings are acoustic tile and acoustic plaster with recessed pinpoint lighting. Walls are painted block and brick. Auditorium walls are covered with colored plastic. Many low wood and glass screen walls are used to increase the apparent size of areas and yet control noise and traffic.

Floors in public areas are finished with vinyl tile and carpeting, while kitchen, terrace and toilet floors are of patterned tile. Special tile murals have been used as focal points in many areas.

Managing the Building

The responsibilities of managing an operation as large as the Student Life Building is such that it will require the full time of one person. An apartment has been provided for the director of this facility so that he will have an office and living quarters within the building and can thereby be on hand to supervise the various activities that are carried on.

The years of raising funds and planning that have gone into the Student Life Building have involved literally thousands of persons. Students, faculty, alumni and friends of the college have watched this development with pride and satisfaction. Their attitudes can and should be the basis for improved teacher education in the State of New Jersey.



Gene Spurlock

The Television School at American University in Washington, D.C., was designed by Charles M. Goodman Associates. The completed building won an award from the Washington Board of Trade.

THE BARTER THAT BUILT AMERICAN UNIVERSITY'S TELEVISION SCHOOL

by SUE FLATER

Director of Publicity, The American University, Washington, D. C.

THE ancient and time-proven system of barter has brought about the building of a new $250,000 television and radio school at the American University in Washington, D. C. The prize winning architectural building is the result of a combined dream of the university, to teach its communication courses in workshops as well as classrooms, and of the Evening Star Broadcasting Company which needed a site for its television transmitter and tower.

The Star, known for its interest in young people and education, regarded the campus of the American University, splendidly situated on one of the highest points in Washington, as an ideal location for its planned transmitter and tower.

The new industry of television needs and wants college trained people. The Star knew, through its own experience at WMAL-TV, that such people could be helped to television careers if better college facilities were provided for them. Here was the opportunity for a bargain that had its feet on the ground and an eye on the future.

It was an unusual plan; both sides would profit. The university gave the Star an enviable site on its campus for the tower and transmitter. In return, the broadcasting company built and gave the television building to the university.

Charles M. Goodman Associates were the university architects at the time and drew up the plans. The completed building won them an award from the Washington Board of Trade when it was selected by an out of town jury of architects. This competition is judged every two years.

A Two Level Structure

Taking advantage of the sloping land selected for its site, the building is constructed on two levels. The basic structure is of reinforced concrete faced with granite at the base and Indiana limestone above. Emphasizing the extremely modern architecture, Mr. Goodman used vitrolite, a blue glass type material, to face portions of the front and lower levels.

Large sections of picture glass on either side of the staircase give the building a futuristic appearance. One can stand at the front entrance and see through the building to the athletic field on the other side.

The upper level, opening off the front of the build-

ing, consists of faculty offices, seminar rooms and the radio workshop where the university radio station WAMU is located. A glassed-in visitors gallery overlooks the television studio below.

The lower level has a side entrance opening onto the parking area. The doors are large enough to allow a pick-up truck to drive inside with heavy sets and equipment, a practical idea suggested by Mr. Kempton, head of the communication department of the University. At this level are the television studio, the control room, the property storage room and workshops for movie production.

Ideas in planning the building came from Mr. Kempton, in charge of the courses conducted there, and Mr. Frank Harvey, chief engineer at WMAL-TV, the Evening Star television station.

A Big Problem

The big problem was the television studio itself, because no one knew what equipment would be used and funds were not immediately available for such a costly venture. To solve this, the architect decided to use a large simple space, flexible enough for conversion to equipment needs later on.

He designed a 45 by 45 feet room with a 21-foot ceiling. It is felt that this room will be flexible enough to accommodate any kind of equipment.

What about lights? Television studios must be designed for a complicated system of lighting equipment. Yet no one really knew, during the planning stage, just what lights the university would be able to buy, or how they would be arranged in the big studio.

The architect discussed this matter with Mr. Harvey who suggested a system of batten rigging like that used at station WMAL. It is similar in many respects to the overhead rigging on a theatre stage. This lighting system consists of a loft space, with pipe batten attached to ropes in such a way that the batten can be raised or lowered. With this system, lights can be brought down for use in any or many parts of the studio, depending on the needs of the particular program in production.

Production Is Halted

Of course, not all problems were confined to the design of the building. Production halted once during excavation when the construction crew dug up an unexploded bomb from World War I. The bomb dated back to a time when the army used the university campus as a testing ground. The army moved in again and the workers moved out, while a demolition team removed the explosive.

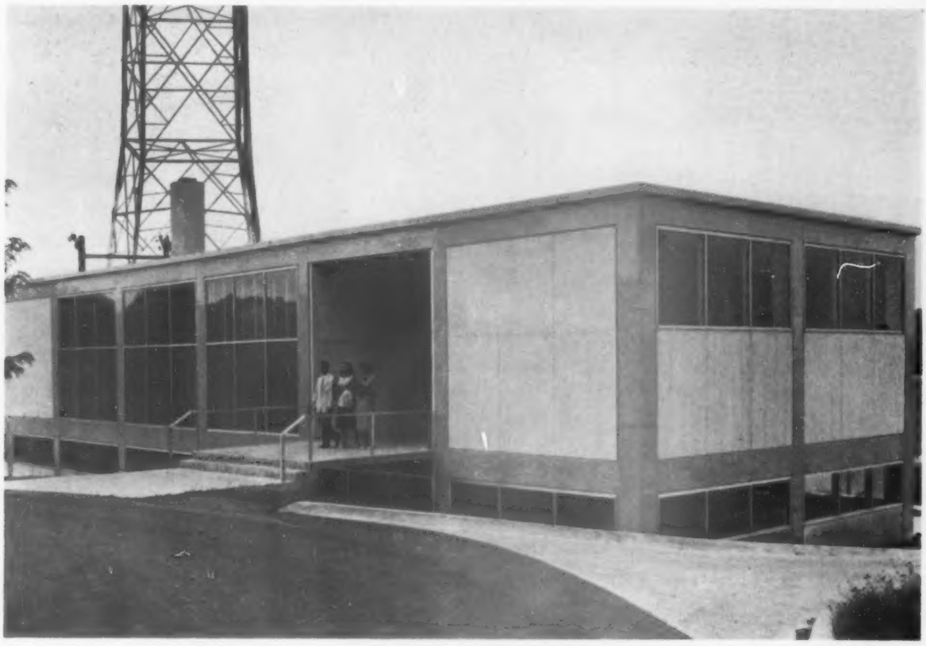
Another time construction stopped because of the New York dock strike. Granite used for the base of the building was quarried in Germany, polished in London and sat on the docks in New York City for weeks until the strike ended.

There were plenty of headaches for the Star and for the university. Even the finished building had some

News for student broadcasts is sent by wire service to the Television and Radio School. News is checked in and sorted according to content.

William S. Petrini Photos

The Studio B control room is located in the radio workshop of the Television Building. Most of the equipment installed in the building was newly purchased.



The television transmitter and tower of the Evening Star Broadcasting Company rises behind the new building.

bugs that had to be corrected later, but it was a worthwhile venture and no one seemed to lose enthusiasm. Pioneering and experimenting, much was learned that another school, wishing to put up such a building for its own campus, can well profit by.

Sound Control Problems

One of the building's good features is that the exterior walls are of heavy masonry, and no noise comes in from the street or surrounding areas. On the other hand, the inside walls, between the studio and control rooms, are solid. These should have been hollow, to leave a deadening air space between the two free-standing walls to prevent transmission of sound.

The American University building has separate air conditioning systems for the television and radio studios to prevent the transmission of sound from one area to another. It is possible that the transmission of sound could be effected through air conditioning ducts by means of fiberglas or some other sound absorbent material. When the ducts are exposed they should not only be lined but also should be acoustically treated on the outside. This prevents the metal from picking up vibrations from the rooms through which it passes.

This was not done originally in the American University building and many of the ducts and walls had to be torn out at considerable expense to correct the situation.

The floor should be constructed so that sound is not transmitted from one studio to another through the concrete slab. This is accomplished by putting spacers in the slab to deaden the sound waves.

The size and shape of the room used for broadcasting from the radio and television studios were designed according to the acoustical qualities of the studio. The sound waves bounce off the walls and ceilings of the room in a ratio determined by acoustical engineers.

All of the windows are of fixed plate glass, none open; another feature to consider in planning a soundproof building.

The completed television building houses the student radio station WAMU. The radio equipment represents an investment of about ten thousand dollars. Money is still needed for television equipment.

The radio equipment includes three high fidelity recording machines. There is a master control room which has lines leading to all parts of the campus from which programs can be originated. There is a direct line to the radio station at the University of Maryland so that programs can be originated on either campus to give students network experience.

Most of the equipment installed in the building was newly purchased. A great deal of the installation was done by students themselves, after an elaborate system of conduits and electrical circuits was installed by an electrical contractor and the Bell Telephone Company.

Promoting Educational Television

American University was one of the organizations which initiated a move for an educational television station in the nation's capital. Named the Greater Washington Educational Television Association, it has as one of its original trustees, Mr. Kempton, whose name is constantly connected with the development of television and radio both within the university curriculum and educational television in general.

The university has offered its television facilities to the community for use in producing educational programs, when the association is activated.

Radio, television and motion picture production in

A glass observation window separates the master control room from one of the studios.

classroom and workshop is being conducted in the new building now. Counting all students, 200 undergraduates and 50 graduate students are working for B.A. or M.A. degrees in these fields. In addition, some courses in journalism and public relations are taught in the building. And a large number of adults, who are employed by day in these and related fields, take evening courses as non-matriculating students.

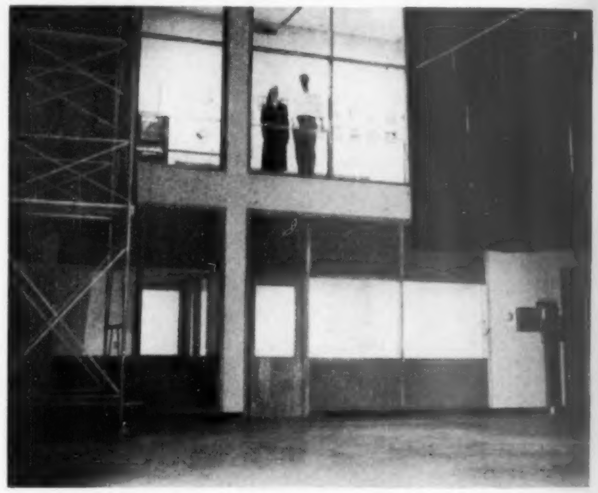
Many courses are conducted by Washington professors who teach part time in addition to their regular jobs in mass communication. For instance, Mr. Charles Bishop, program director and assistant general manager of WMAL-TV, teaches courses in television production and television workshop.

The new television building is also the national headquarters for the program department of the Intercollegiate Broadcasting System, of which 100 colleges are members.

Television at the College Level

Planning a television and radio building can produce a lot of heartaches for the people who participate in the project. An exacting science, fast becoming a specialty in itself, television is a new industry. College men and women want to learn about it at the college level. A university that intends to meet this new need for its students has to go a step further than establishing the courses. It has to have the heart and find the way to put up a building where students can really learn by doing.

A gallery for visitors and a control room overlook the television production studio.



The Arnold Volpe Classroom Building for the School of Music at the University of Miami was designed to provide three different classroom sizes for music students. The basic structure is a reinforced concrete frame.

THE UNIVERSITY OF MIAMI SCHOOL OF MUSIC

by ROBERT M. LITTLE

AIA, Architect, Miami, Florida

Robert M. Little, architect from Miami, Florida, is a native of Pennsylvania. He has designed many residential and educational buildings in Florida and Puerto Rico. Mr. Little's contemporary tropical buildings are known from coast to coast and the designs have appeared in national publications.

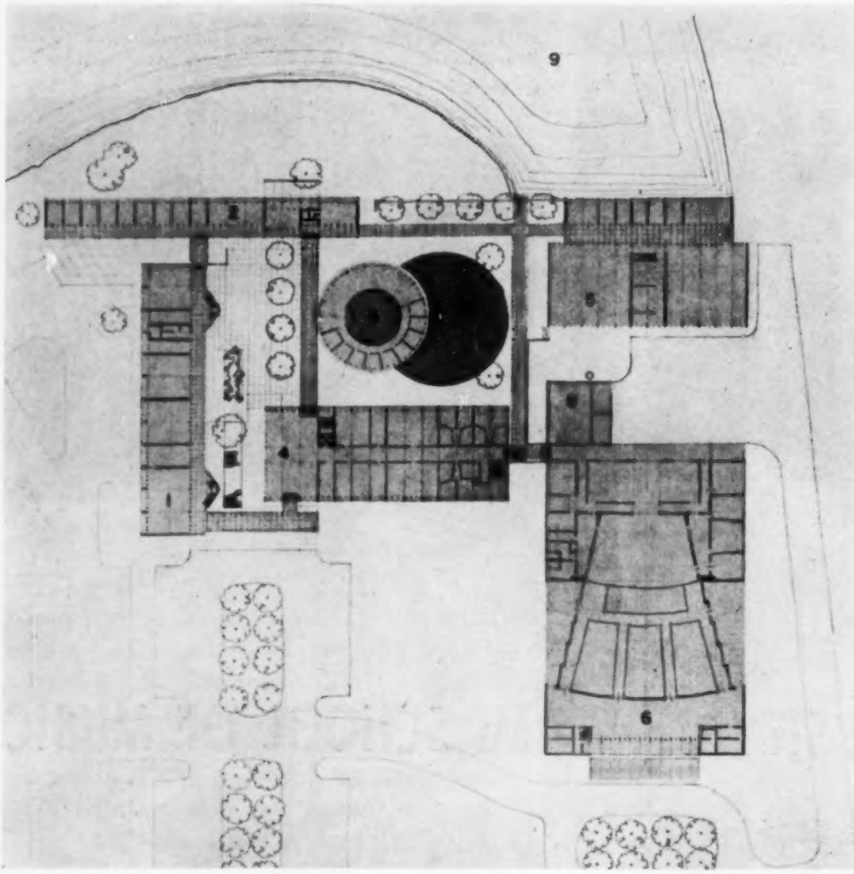
WITH the dedication of the Arnold Volpe Building in the fall of 1954, the University of Miami at Coral Gables, Florida, completed the first stage of development of the building group which will house the School of Music. Planned to accommodate an enrollment of approximately 300 full time music majors and 400 to 500 others, the final building group will be situated on the bank of the campus lake between the band drill field and the School of Drama and Speech with its world famous "Ring Theatre."

Current estimates place the total project cost for the new School of Music in the neighborhood of one million dollars, but the plans have been developed to facilitate stage-by-stage construction, as funds become available.

When completed, the music school will be housed in six separate structures arranged in and around plazas and gardens rich with tropical plants and cool pools of water. Wide loggias, providing shelter from the sun and rain, will connect the various buildings. The classrooms required are arranged in a two story building. The structure is oriented so that a wide open gallery along the south side gives protection to the large louvered openings which capture the prevailing southeasterly breeze. The ground floor gallery of this building is extended at one end to connect with a corridor along the north side of the school's administration building.

The Music Library

Midway along a loggia between the administration building and the private study and practice building is the entrance to the air-conditioned, circular music library with its reading room and listening rooms surrounding a central storage area. The private study and practice building will contain, in addition to studios and laboratories, a student lounge on the ground floor at the north end of the building. The lounge will open



The major areas of the School of Music are: 1. classroom building; 2. administration; 3. central library; 4. private study and practice; 5. band and choral; 6. symphony workshop; 7. drill field; 8. mechanical; 9. adjoining lake.

to loggias leading from classrooms, library and administrative offices. This building, as well as the symphony workshop and band and chorus buildings, will be fully air-conditioned and carefully detailed to eliminate any disturbing transmission of sound from one area to another.

The band and chorus building will provide separate rehearsal rooms for each group with storage space for instruments and uniforms between. Offices for the directors and their staffs will be arranged along a corridor leading to the drill field.

The Symphony Workshop

The symphony workshop building, as it is planned, will contain the best possible stage facilities and equipment for the rehearsal and study of symphony and opera groups. Auditorium seating for approximately 600 people is considered adequate to assure proper acoustical balance for symphony rehearsals and to accommodate attendance at recitals.

Full scale symphonic and operatic presentations may require an auditorium seating three to four thousand people, if present community interest in the University Symphony continues to grow. The distribution of population in the area seems to indicate a continuation, at least during the foreseeable future, of the use of the more centrally located civic auditoriums.

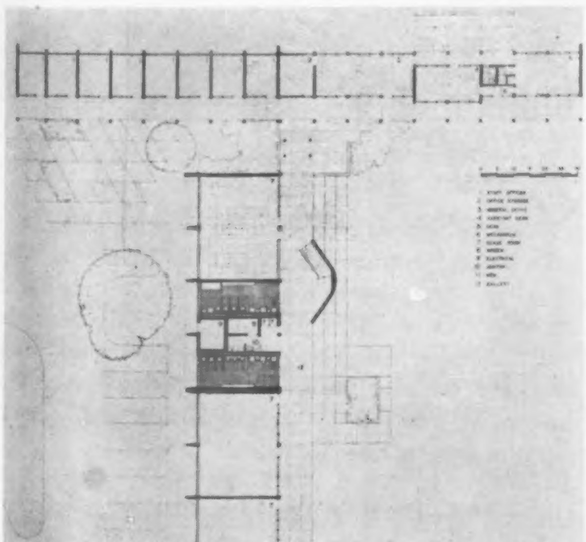
The two story classroom wing of the completed

The classroom building is two stories high. There is a wide gallery on the south side of the structure.

Arnold Volpe Building was designed to provide three different classroom sizes, and yet allows changes in these sizes as later needs may require. To facilitate such changes the basic structure was designed as a reinforced concrete frame in which all walls are nonloadbearing and may therefore be readily removed and

Floors in the administration building are monolithic terrazzo throughout. The message center in the general office has brightly colored mail boxes mounted on a white metal screen.

The administration building (top) is perpendicular to the two story classroom section of the University of Miami's new School of Music.



relocated. Doors have been installed in each column bay to afford access to any room which is at least sixteen feet in width. The lighting fixtures are arranged so that they will not interfere with relocation of partitions, provided the partitions are kept on column centers.

The minimum classroom, 16 feet by 24 feet or 384 square feet in area, was allowed to determine the structural pattern of the building, with minor adjustment to accommodate stock aluminum jalousies in wood sub-frames on the protected south wall. There are seven of these minimum classrooms, each with a maximum seating capacity of 30 students, four medium sized classrooms each seating 60, and one large ground floor classroom with a capacity of between 80 and 100 students.

The large classroom is equipped with high fidelity sound equipment for record playing and recording, a small raised stage and a concert grand piano. The present arrangement of the classrooms has been determined largely by the need for isolation of the "loud" areas from the "quiet" areas, since this building must serve temporarily as both studio and classroom space pending the completion of a separate studio building.

Orientation of Classrooms

The classroom building is oriented so that the wide gallery along the south side affords ample protection against sun and rain for large openings into the

The large classroom is equipped with high fidelity sound equipment for record playing and recording. It has a small raised stage and a concert grand piano.

A wide loggia connects the administration building with the adjacent classroom section.

The dean's office is a large area with low wall cabinets. Windows are hand-operated.

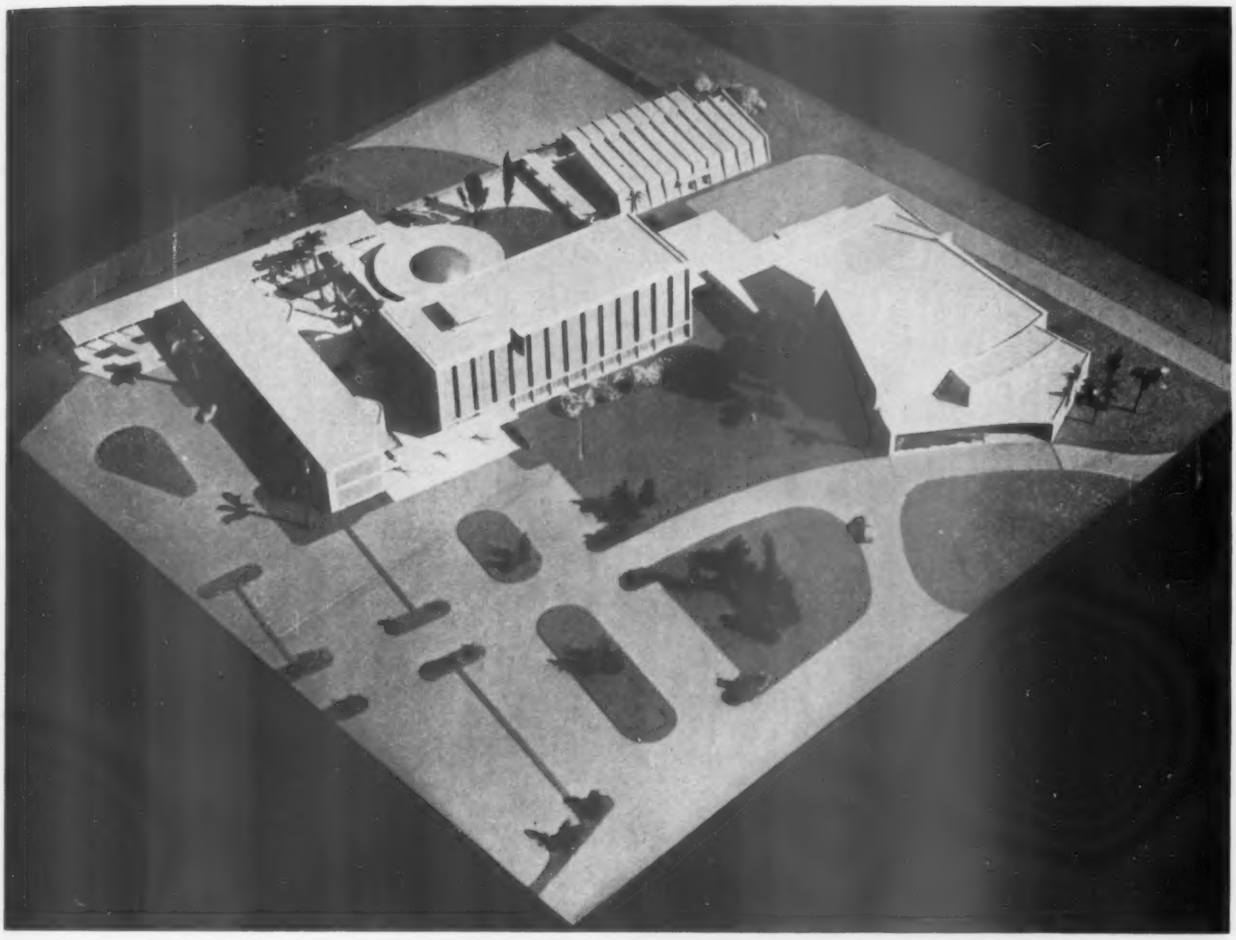
rooms to capture breezes from the south. These openings are fitted with redwood louvers which open to permit the passage of air and yet offer visual privacy in the classroom and a means of controlling the changing daylight.

The deep projection of roof and floor slabs and columns on the north side of the building afford similar protection for awning-type windows and greatly reduce the travel of sound through the windows from one room to the next. Several of the wing columns contain rain water conductors and eliminate the need for costly interior storm water drainage piping or gutters and leaders on the exterior of the building.

Two stairs connect the ground floor and second floor galleries. Since the cost of an elevator was deemed to be prohibitive, these stairs were designed to facilitate the movement from floor to floor of pianos and large musical instruments without the hazard of sharp turns or other obstructions. The massive reinforced concrete walls which support the stairs also offer protection against rain. These walls, as well as all other structural concrete surfaces, were finished, once the forms were removed, by the simple and speedy application of exterior masonry paint.

The Finished Product

The structural concrete framework of the columns, beams and slabs was painted a light gray to further define the framework of the building from the darker gray of the masonry wall panels at the ends of the building, the light green interior walls and the terra cotta colored panels below the windows on the north.



Approximately 400 to 500 non-music majors are also expected to use these new buildings.

The redwood jalousie louvers and sub-frames and birch doors along the galleries are finished to bring out all the natural beauty of the wood in contrast to the clean sparkle of aluminum hand rails, jalousie frames, gravel stop and fascia and bullet-shaped light reflectors.

In addition to the men's and women's rest rooms, the classroom building contains a janitor's supply closet and toilet, an electric transformer vault and switch panel room and two public telephone booths.

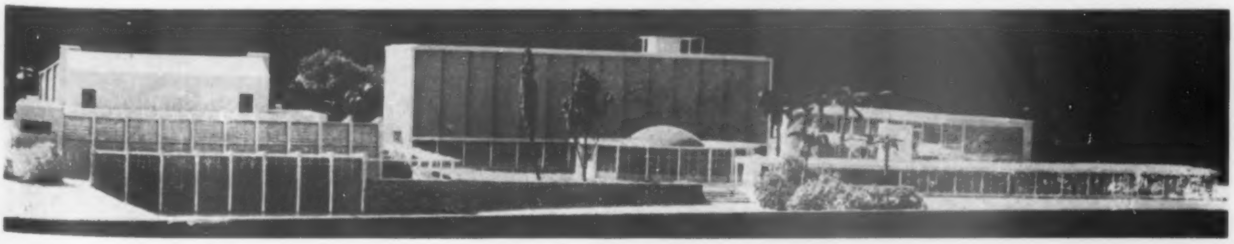
The Administration Building

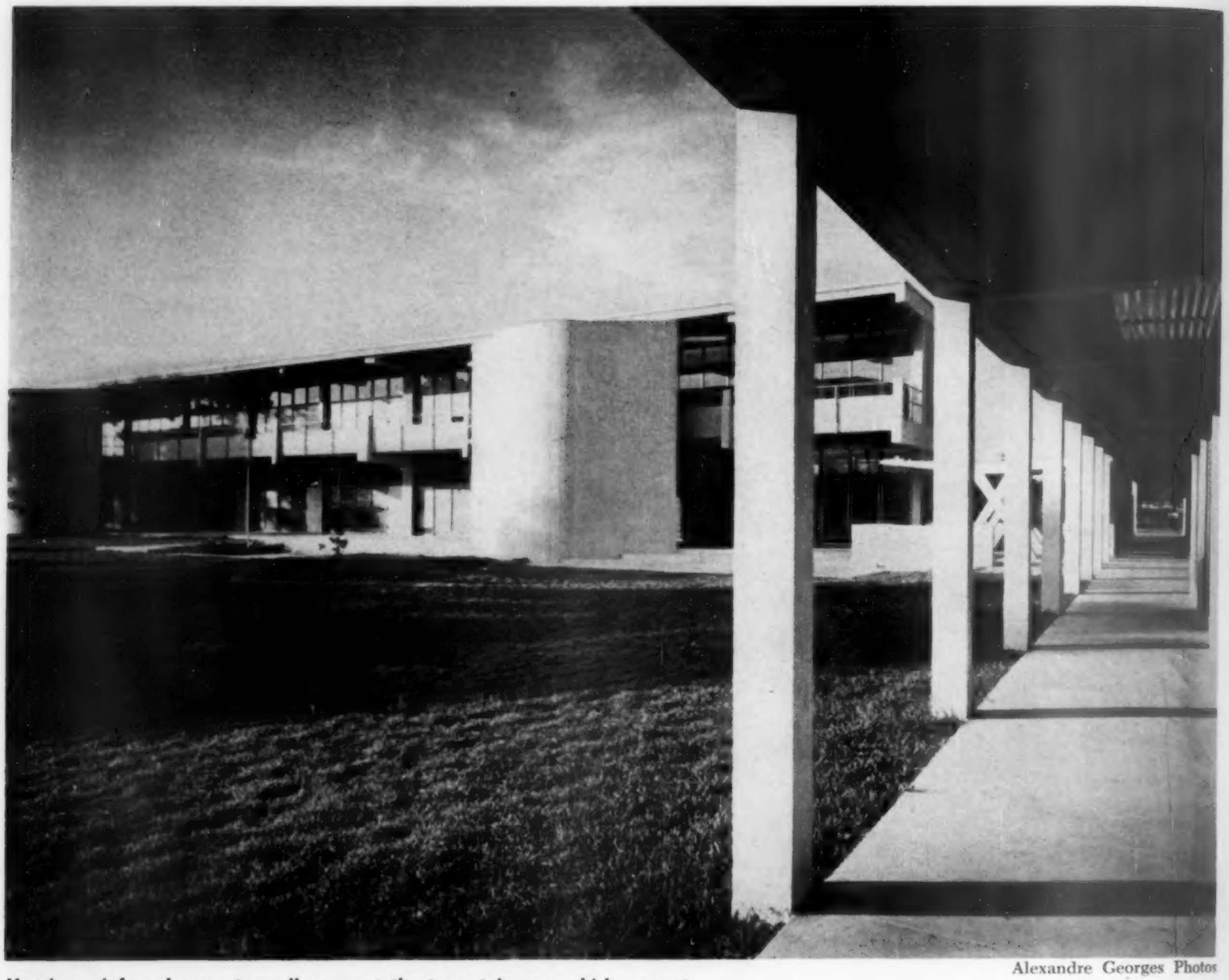
The covered gallery along the west side of the one story administration building is connected to the gallery of the classroom building by a separate loggia. In contrast to the classroom building, the structural system employed in the administration building was designed to take advantage of a large number of load-bearing walls spaced fairly close together to separate a series of small faculty offices. By the addition of light concrete beams the same basic structure was adapted to provide the large spaces needed for the offices of the dean, the assistant dean and their staff.

A semi-private gallery and terrace were located to the east, overlooking the lake, between the dean's office and the general office in order to facilitate passage from one office to another. The materials employed and the colors used in this building are the same as were used in the classroom building.

The roof is a five-ply built-up gravel roof with a

Approximately 400 to 500 non-music majors are also expected to use these buildings.





Alexandre Georges Photos

Massive reinforced concrete walls support the two stairways which connect the different floor levels of the classroom building. They also afford protection against the rain. The stairways are wide enough to facilitate the movement of pianos and other large musical instruments.

twenty-year bond furnished by the manufacturer. The ceilings are ¾-inch thick random perforated acoustical cane fiber tile on an H and T suspension system, mounted directly to the concrete second floor or roof construction.

Baseboards in all rooms are six inches high glazed ceramic tile for ease in cleaning. The floors are monolithic terrazzo throughout.

The total area of the building, allowing two-thirds of the actual area for galleries, stairs and loggias, is 13,820 square feet. The total cost of the building, including fees but excluding furniture, was $134,581.44. A unit cost of $9.73 per square foot of total area was achieved. The total enclosed space, exclusive of galleries, stairs and loggias, is 10,640 square feet. This space cost approximately $12.64 per square foot.

Meyers Photo Shop

The Loeffler Industrial Arts Building was constructed at Oklahoma City University after fire had destroyed buildings at the core of the campus. Architects of the structure are Sorey, Hill and Sorey of Oklahoma City.

NEW INDUSTRIAL ARTS BUILDING AT OKLAHOMA CITY UNIVERSITY

by LORETTA ABELL

Director of Publicity, Oklahoma City University, Oklahoma City, Oklahoma

Miss Abell studied at Oklahoma Agricultural and Mechanical College, Stillwater, and received her B.S. degree from Oklahoma City University in 1955. She has done graduate work in journalism at the University of Oklahoma.

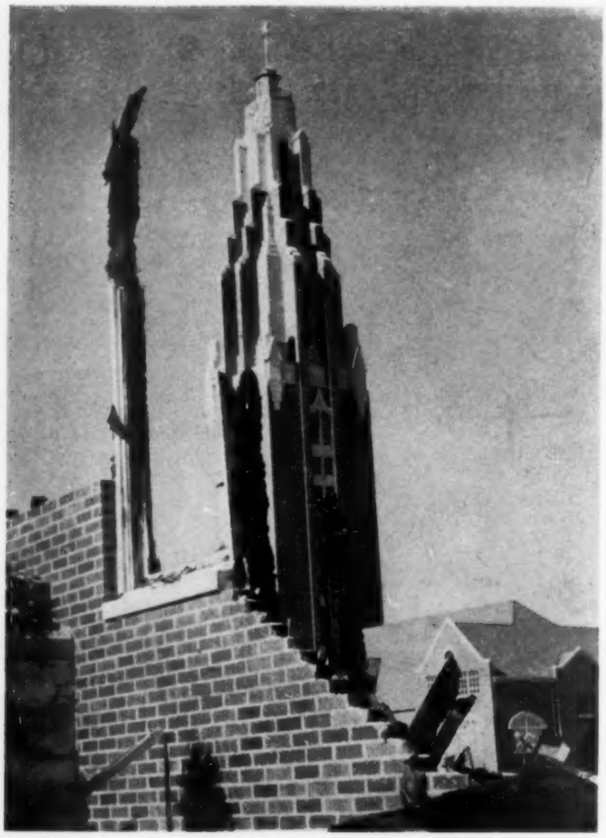
NO one who watched the flame and smoke of the fire at the heart of the Oklahoma City University campus on June 16, 1954, could see anything but disaster. However, that fire became almost a blessing in disguise for now OCU's School of Industrial Arts is housed in a large new steel, brick and concrete structure. A tragedy become a triumph.

This "triumph" gave OCU spacious fire-resistant buildings in place of old crowded structures. Included in the reconstruction program was the Loeffler Industrial Arts Building, the C. Q. Smith Student-Faculty Center and the Central Heating Plant. Construction of the three buildings began in July, 1954, and by May 25, 1955, the buildings were completed and convocation ceremonies were held.

Architects for the Job

Sorey, Hill and Sorey, Oklahoma City architects, were handed the problem of designing the building for an ever-increasing enrollment of industrial arts students. (The school was the first to award the Bachelor of Industrial Arts degree.) The building was to accommodate the automotive laboratory, woodworking and drafting departments.

The university's student union building was one of the structures destroyed by the fire in 1954.



When the fire was finally put out the university's Gold Star Memorial Building could be viewed through the blackened ruins.

A further problem was to design a building which would provide necessary facilities and yet remain within the school's financial range. The architects finally determined that, rather than compete with the stately Gothic-type architecture of existing campus structures, the new structure would be contemporary in design, yet in harmony with the older buildings on the campus.

Costs Kept at a Minimum

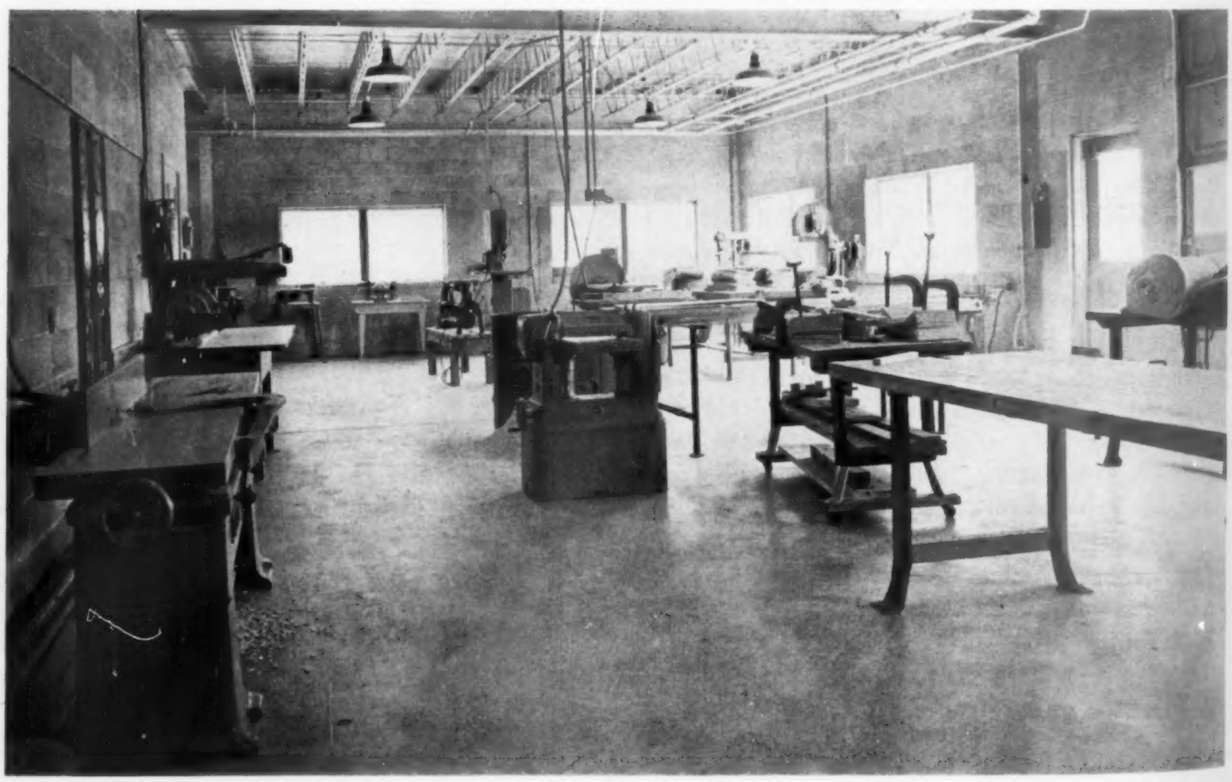
President C. Q. Smith and the Methodist university's trustees emphasized the necessity of keeping maintenance and building costs to an absolute minimum. Utmost care was exercised in the selection of materials and methods of construction, with each square foot planned for practical utilization.

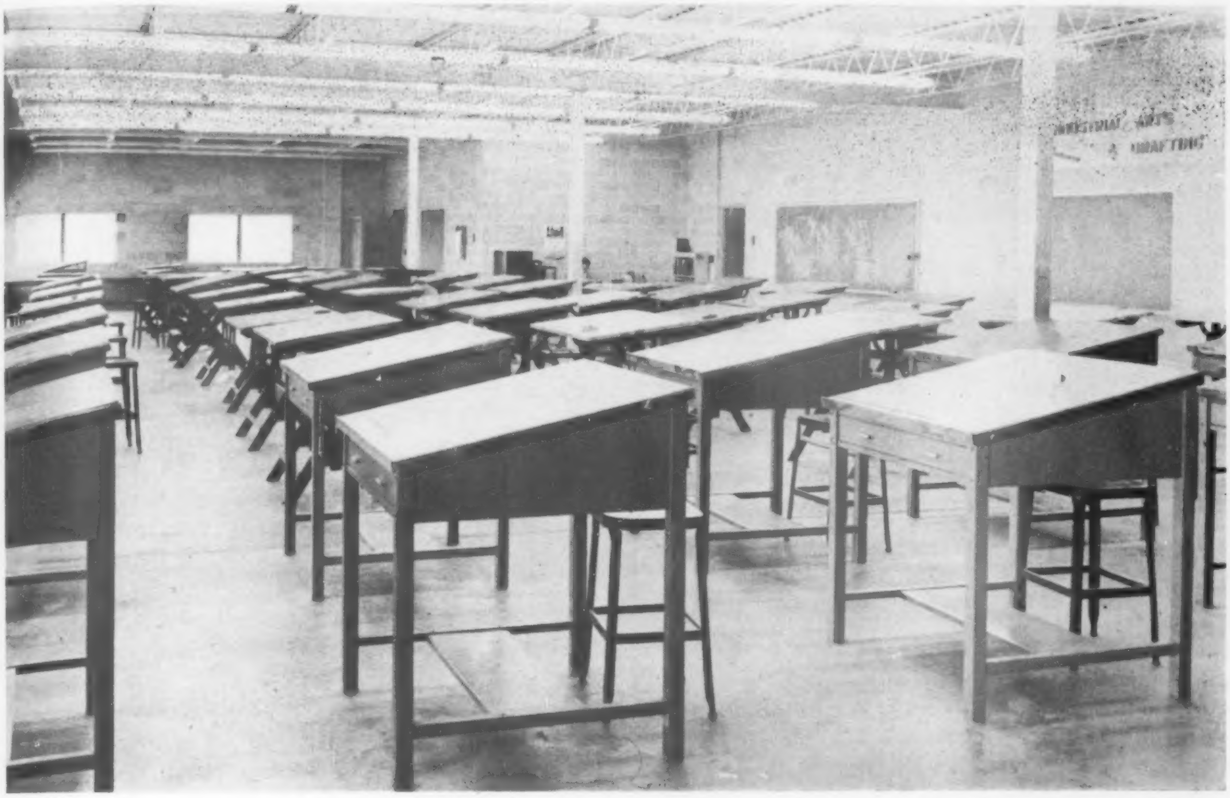
The exterior of the Industrial Arts Building is of red brick, matching the red brick exteriors of other buildings. Roof construction consists of a built-up roof on steel decking supported by metal joists.

A simple interior finish was achieved by painting directly on the concrete block walls. Color tones are light to create a feeling of spaciousness. They are soft and harmonious with the incandescent or fluorescent lighting used according to departmental needs.

The two-story structure with its 36,000 square feet of floor space is 80 feet by 225 feet and adequately

The woodworking division, which provides teacher training in the industrial arts field, also furnishes practical experience to students in this completely equipped shop. The shop is located in the southeast corner on the first floor of the building. A storage area adjoins and there is direct access from the room to outdoors and to the diesel division in the next room.





The drafting room is on the second floor and is soundproofed against noises from the shop areas. Far corner enclosure is a classroom.

accommodates 550 to 600 students in its three departments.

First Floor Accommodations

The first floor of the Industrial Arts plant includes offices for Dean Fred B. Robson and Associate Dean James H. Jackson. A large general office, space for student counseling, as well as for faculty meetings, is provided by these facilities.

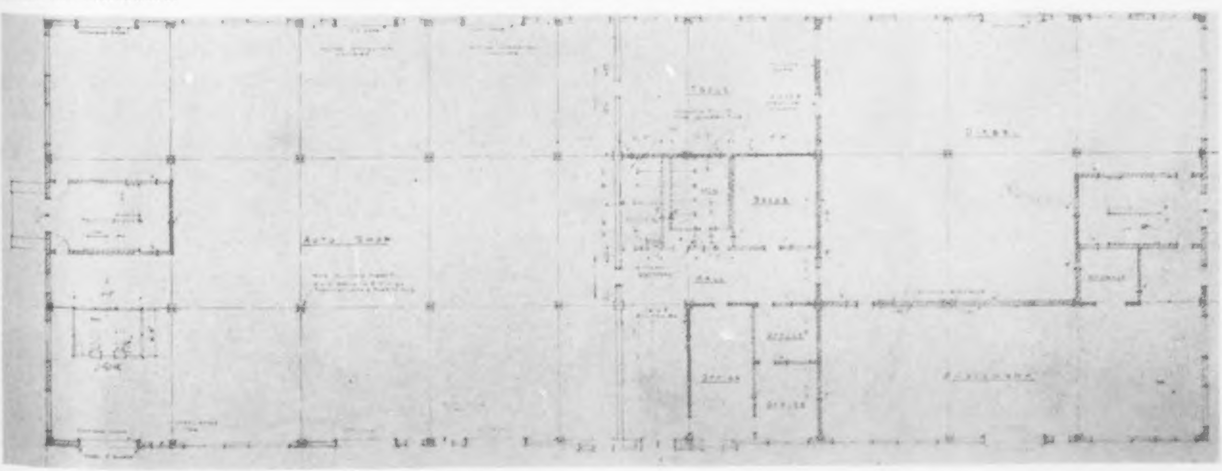
The automotive laboratory, 80 feet by 75 feet, is also on the first floor. Divisions for front end and brake adjustment and tune-up and general motor overhaul are located in a large garage area attached to the building. A separate lab, 50 feet by 75 feet, houses high and low speed diesel equipment.

Woodworking, the division which provides teacher training in the industrial arts field and furnishes practical experience, is located in the southeast corner.

Second Floor Facilities

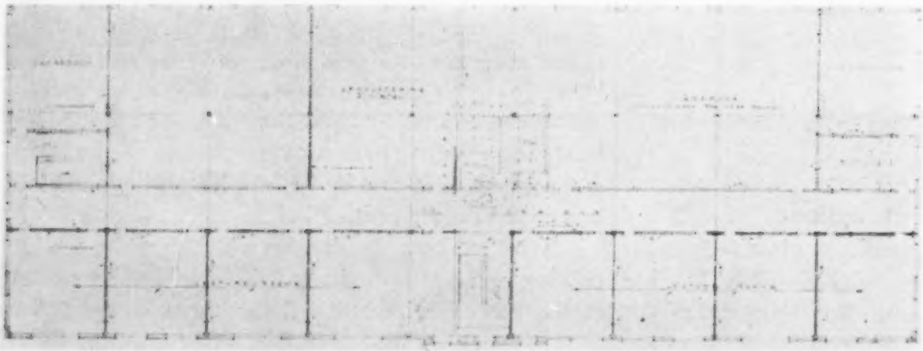
The second floor houses further facilities for the automotive division, drafting and twelve classrooms.

The first floor of the building contains the auto shop, diesel room, woodwork shop, a tool room, book area, storage rooms and offices for instructors.



Jess Malheny

Part of the automotive shop is an exhibit room where various machine parts are put on display.



On the second floor of the Loeffler Industrial Arts Building are the upholstering and metal shop, the drafting room, lecture rooms and classrooms.

The drafting department includes a section on architecture and for reproduction of drawings by the Ozalid and Bruning processes. The automotive demonstration area, devoted to automatic transmissions, is also on this floor.

Other Divisions of the School

Other divisions of the Industrial Arts School, not located in the Loeffler Industrial Arts Building, are electronics, refrigeration, air conditioning and heating and metallurgy.

Most recent addition to the equipment of the building is a Westinghouse-Bendix air-brake division, where actual truck mockups are used to further student training. This division is located on the first floor.

The school was constructed at a cost of approximately $195,000, and the expenditure for equipment brings the total building value up to $250,000. The school offers a Bachelor of Industrial Arts degree which is actually a degree of engineering aid and/or assistant. Industry has a great demand for men and women with this degree and is well pleased with OCU candidates.

Nomenclature for the building was in honor of Mr. and Mrs. Frank X. Loeffler, residents of Oklahoma City and longtime friends and supporters of the urban university.

A U-SHAPED SCHOOL OF PHARMACY BUILDING

by GERALDINE B. NOVOTNY

Assistant Editor, Division of Communications, University of Connecticut, Storrs, Connecticut

Miss Novotny has a B.A. degree from the University of Wisconsin and an M.S. from Boston University. She was a departmental assistant at the University of Connecticut's division of publications and became an assistant editor there in 1950. From 1943 to 1945 Miss Novotny was a member of the U.S. Marine Corps Women's Reserve, Marine Corps Base, San Diego, California.

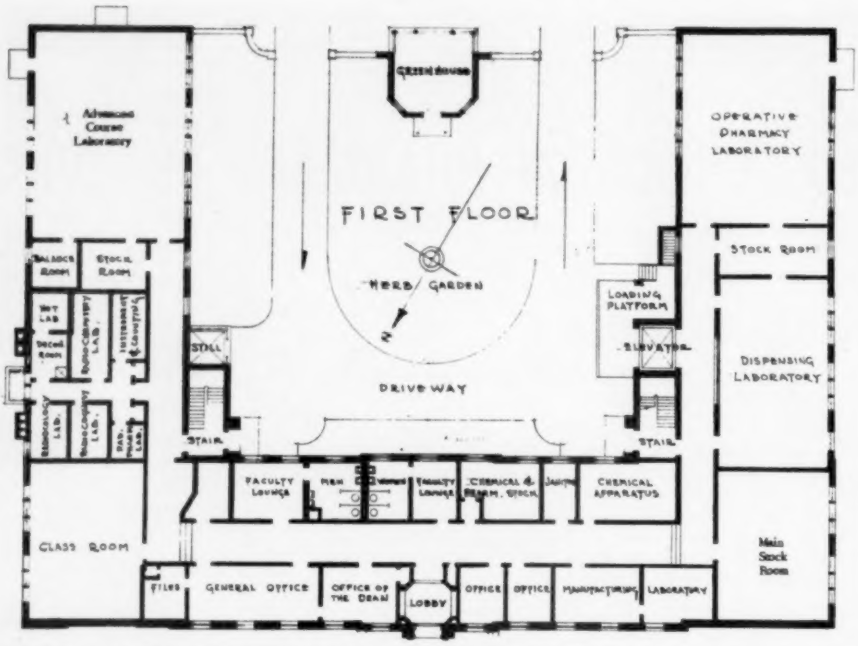
THE University of Connecticut School of Pharmacy, with an enrollment of 400 undergraduates and 25 graduates, is housed in a three-story building of modernized Georgian architecture with common red brick facing and Indiana limestone trim. The octagonal entrance is graced by two artistically designed display cases. The building faces the School of Engineering, and is adjacent to the Student Union building, completing the southern end of a quadrangle on west campus.

The building was planned for extensive study and research in the many phases of pharmacy, with the needs of the school as the basic principle of design. The layout on each floor is designed to obtain a minimum of lost effort in moving around. It is a concrete frame, U-shaped structure with a general arrangement of two laboratories and a classroom in each wing on each floor. All graduate and advanced course work and research activities of the pharmacology, pharmacognosy, pharmaceutical chemistry and pharmacy departments are located in the wings, removed from the general traffic of undergraduate teaching. The U-shape of the building provides a maximum of light and air in all laboratories.

The central position of the U serves for administrative quarters on the first floor, faculty offices and seminars on the second floor and a lecture hall and library on the third floor.

On the first floor, administration quarters house

The School of Pharmacy at the University of Connecticut is considered one of the most modern in design and equipment among pharmacy schools in the United States. Smith & Persse are the architects.



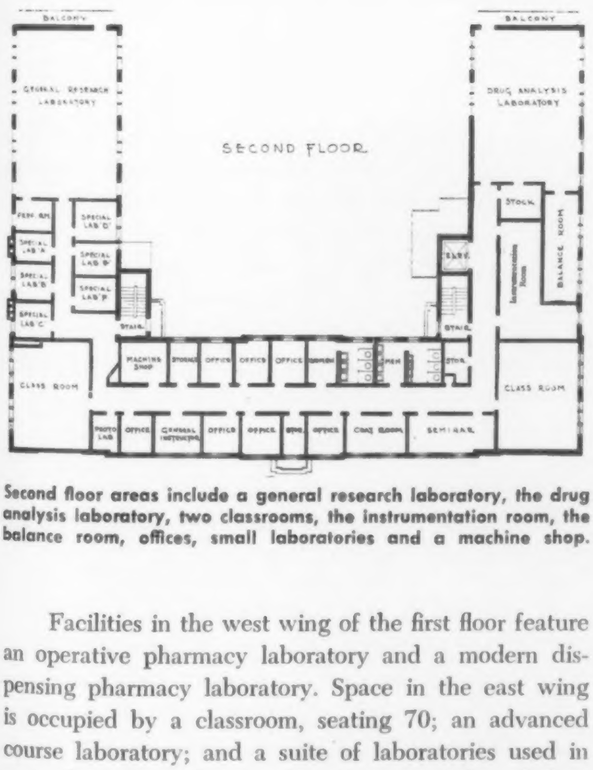
On the first floor of the new school of pharmacy building are four large laboratories, a classroom, main stock room and the administrative offices, plus many smaller areas.

the office of the dean, two faculty offices, two faculty lounges, the School of Pharmacy office and storage facilities, as well as a fermentation room. Also in this section, adjacent to the main stockroom in the west wing, is a model products formulation laboratory where pharmaceutical manufacturing is taught on a small but authentic scale. The apparatus utilized includes a punch tablet making device, a hand tablet machine, a mixing machine, a machine for filling, folding and crimping tubes, a colloid mill, a convection oven, a steam kettle and a pill coating machine. The formulation lab gives graduate students training in the problems of pharmaceutical manufacturing, requiring them to follow through a pharmaceutical formula from its creation until it reaches the pharmacy shelves.

The hot laboratory extends fourteen feet below the ground floor and is constructed of concrete two feet thick on all sides.

All graduate research laboratories, like the one shown here, are located in the wings of the building and are removed from the general traffic of undergraduate teaching.

The Hugh P. Beirne Memorial Library is housed in the central section of the school, on the third floor. Fluorescent lighting is provided in the reading table section.



Second floor areas include a general research laboratory, the drug analysis laboratory, two classrooms, the instrumentation room, the balance room, offices, small laboratories and a machine shop.

Facilities in the west wing of the first floor feature an operative pharmacy laboratory and a modern dispensing pharmacy laboratory. Space in the east wing is occupied by a classroom, seating 70; an advanced course laboratory; and a suite of laboratories used in research work involving radioactive materials and their effect on plants and animals with heat, light and temperature control. The latter laboratory also serves as a reservoir for all radioactive material used in research throughout the university.

The Isotope Center

The isotope center is composed of four main and two subsidiary rooms. Basically, within this center are an instrument room for measuring radiation and assaying radioactive material; a radiochemistry room containing disposal units for decontaminated material, complete with hoods; a radiopharmacology room designed for research in therapeutic action of "hot" material on test animals; a radiopharmacy room, and a radiopharmacognosy room, in which the functioning of plants may be studied upon passing traceable radioactive material through the plant systems; and a "hot" laboratory, built in compliance with specifications of the Atomic Energy Commission.

The "Hot" Laboratory

The "hot" lab extends fourteen feet below the ground floor, and is constructed of concrete two feet thick on all sides, to prevent injury from radiation. The handling of all radioactive material is done mechanically and all precautions have been taken to insure utmost safety when working with these materials. Two closets offer protection: one for working clothes and the

Undergraduate students are at work in one of the laboratories provided for their research activities. All laboratories in the building are completely equipped.

other for outdoor clothes. In addition, there is a decontamination room with a multi-fauceted shower to insure complete washing of all parts of the body. It also has a peddle operated sink to guard against the spreading of radioactive material from people's hands.

Second Floor Facilities

Most of the faculty offices are on the second floor in the central U section of the building which also houses seminar and conference rooms. Located in the same section next to the east wing, a photographic lab and a machine shop which permits the School of Pharmacy to build its own equipment, provide a unique setup for carrying on graduate and research programs.

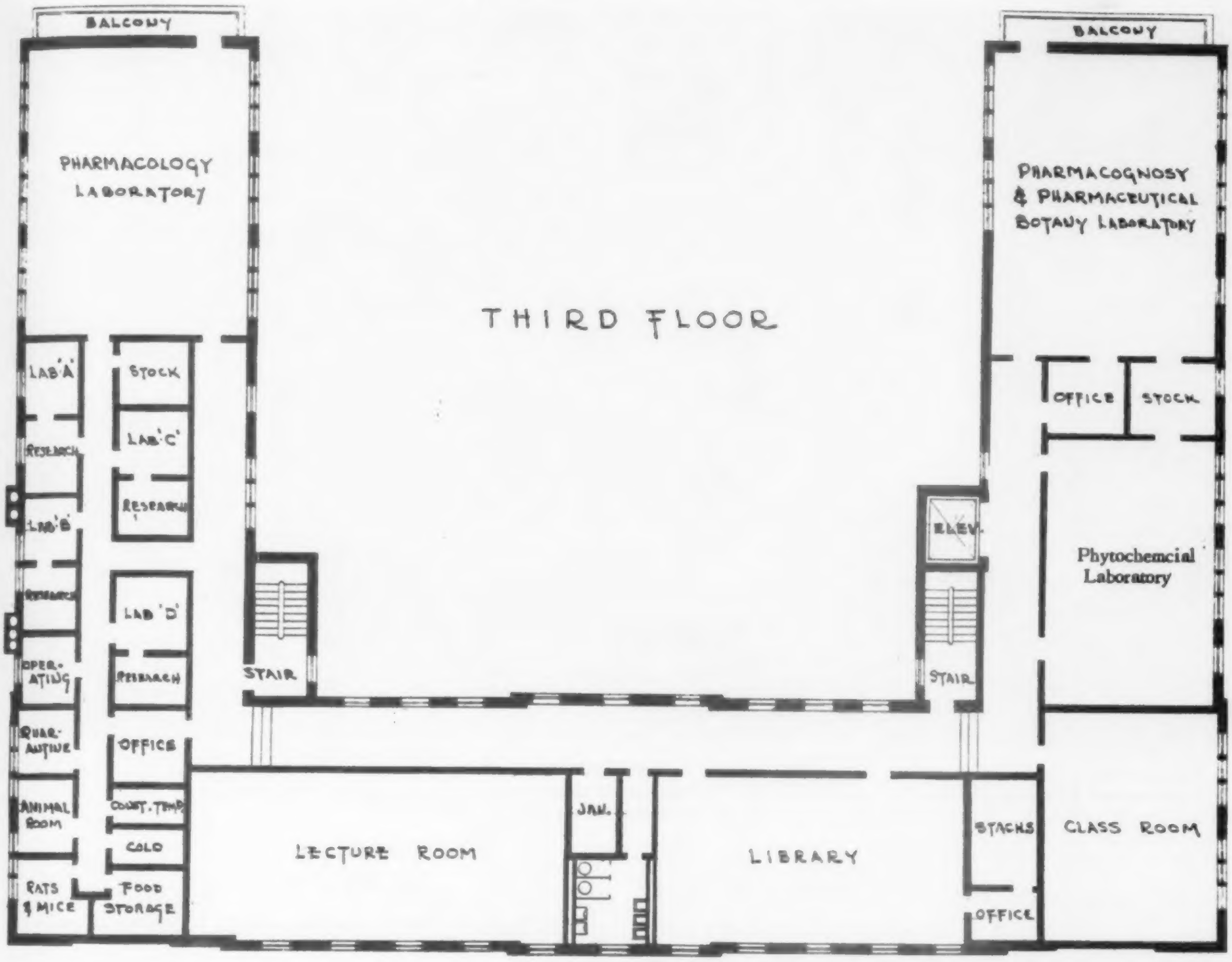
The east wing on the second floor includes a large general research laboratory accompanied by six special project labs for sponsored research and a classroom, seating 70. A drug analysis laboratory, a balance room, alongside of the instrumentation room, and a classroom occupy the total floor space of the west wing.

The Hugh P. Beirne Memorial Library and a large lecture-demonstration room, seating 110, are housed in the central section of the building on the third floor. Facilities of the pharmacology department include a pharmacology teaching lab in the east wing which is unusual in design, with working tables arranged around the walls, and lecture and demonstration tables in the center, in a kind of amphitheatre. The same wing includes four "animal suites" for research purposes, cold and hot rooms where research is carried on at constant temperatures, quarantine and operating rooms, and an office.

Space in the west wing on the third floor is allotted to a large pharmacognosy and pharmaceutical botany laboratory as well as a phytochemical laboratory which adjoins a classroom for 70 students.

Interior Details

Throughout the building, each laboratory has its own substockroom, served by main stockrooms located on the first floor. All laboratories are completely equipped with a supply of steam, gas, air, vacuum, hot and cold water, distilled water and electricity. In addition, all laboratories are separately equipped with sup-



On the third floor are the pharmacology laboratory, the pharmacognosy and pharmaceutical botany laboratory, phytochemical laboratory, a large lecture room and the school library.

A corridor view of the dispensing laboratory which is one of the outstanding features of the University of Connecticut School of Pharmacy. Here students learn how to compound prescriptions.

An herb garden is in the courtyard adjacent to the small greenhouse which is kept for experimental purposes. The garden is used to teach students about drugs from the sowing of seeds, the stages of cultivation to their collection and manufacture.

ply and exhaust ventilation. The laboratories and classrooms are constructed of exposed cement block and concrete walls, acoustical tile ceilings and asphalt or vinyl tile floors.

The two wings of the building have been tied together architecturally by a brick wall, forming an enclosed courtyard. Running into the courtyard, through this wall, is a U-shaped black top service drive connecting to stair towers and the freight elevator platform. Centered in the brick wall is a small greenhouse which is already in use for experimental purposes.

An unusual feature of the courtyard is a drug garden. Students learn to know about drugs from the sowing of seeds, the stages of cultivation, the collection and the manufacture of a finished product, whether a pill or tincture. These pharmaceutical products can then be assayed chemically or pharmacologically in laboratory work, giving a complete story of the materials of medicine until they reach the final consumer.

Cost Figures

The total floor area of the School of Pharmacy building is approximately 37,850 square feet. The construction costs amounted to $850,000. The cost of non-scientific laboratory equipment is estimated at $200,000. Construction was completed in 1952. The architects of the building are Smith and Persse of New Haven, Connecticut.

Fine Art Studio

Cleveland Hall and Chemistry Laboratory was built at a total cost of $1,002,000.

HOUSING THE CHEMISTRY DEPARTMENT AT MOUNT HOLYOKE

by OTTO C. KOHLER

Business Manager, Mount Holyoke College, South Hadley, Massachusetts

Mr. Kohler has a B.S. degree in Architectural Engineering from Massachusetts Institute of Technology. He joined the staff of Mount Holyoke in 1932 to reorganize the maintenance department and, except for five years of army service, has been continuously associated with the college.

and DOUGLAS W. ORR

Office of Douglas Orr, Architect, New Haven, Connecticut

Mr. Orr has bachelor's and master's degrees from Yale University. He also studied in Europe on the William Wirt Winchester Fellowship. He has engaged in a general practice of architecture in New England since 1926. Mr. Orr was president of the American Institute of Architects from 1947–49. He is an associate of the National Academy of Design and president of the American Architectural Foundation, Inc.

On April 13, 1955, Mount Holyoke's new Cleveland Hall and Chemistry Laboratory, made possible by the generous bequest of Newcomb Cleveland and many gifts from other good friends, was formally dedicated to the achievements of former teachers and students and to the promise of students of the present and the future. Well designed and completely equipped, the new laboratory and lecture halls add a fresh note of progress to the college's historic campus.

Mount Holyoke's first chemistry building was constructed in 1892 and marked the initial segregation of this course of instruction from the "general science" category. The building was named Shattuck Hall in honor of Lydia W. Shattuck, beloved professor of botany from 1851 to 1889. As the department continued to grow in academic recognition and enrollment, the original structure was frequently enlarged and remodeled, but it had been evident for a long time that it was inadequate for modern chemistry instruction.

In December, 1953, ground was broken for the new building and it was completed in September of 1954 at a total cost of $1,002,000, including architects' fees, site preparation and laboratory furniture. To make way for the new building old Shattuck Hall had to be removed. The name of Shattuck, however, has been perpetuated by applying it to the Physics Building (completed 1932) which became an integral part of the science center at Mount Holyoke by being joined to the new chemistry building.

The New Science Quadrangle

Cleveland Hall and Chemistry Laboratory contains 60,000 square feet of usable area with a cubical content of 940,000 cubic feet. The building was located where

George Woodruff

The elementary laboratories, like the chemistry laboratory shown here, are located on the first floor of the new building.

it would unify the sciences and give a close relationship to the present Physics Building. New lecture room facilities were required for the physics group and were provided in the new wing which connects the two buildings. Good relationship to the Plant Science Laboratory, whose work is frequently allied with chemistry, is also achieved. The ultimate plan for this center will include a science library building between Clapp Hall and Physics to complete the establishment of a science quadrangle.

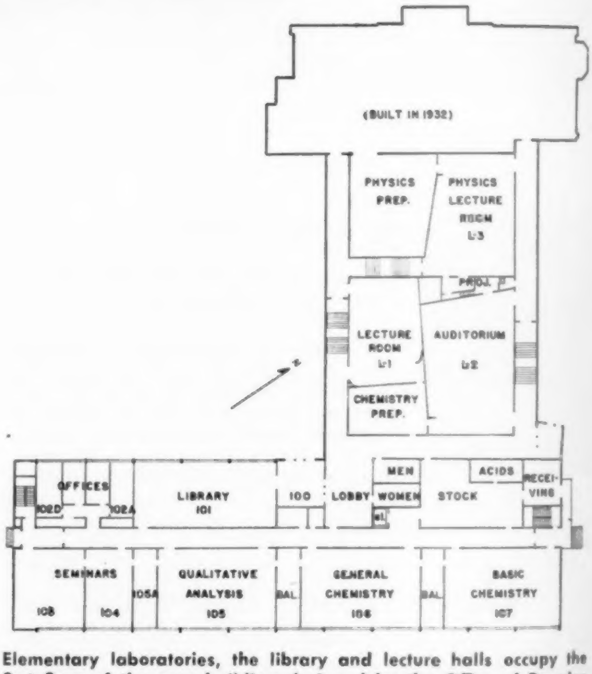
A Construction Problem

Shattuck Hall, which was to be replaced by the new laboratory building, presented a construction problem because of its location. In order to erect the new building on its chosen site, it was necessary to build on a portion of the area covered by Shattuck Hall. Since this had to be kept in operation during the college year, it was necessary to plan the new building so that a large portion of the new construction could be carried on without disturbing the existing building.

It was also necessary to have a place where equipment and supplies to be reused could be stored when Shattuck Hall was torn down. The work was scheduled in this manner: construction on the laboratory wing of the new addition was completed; the old building was demolished; at the same time, construction on the Lecture Hall wing was continued.

The new building plan developed from a very carefully prepared and detailed program of requirements drawn up by the Chemistry Department. A clear-cut distinction in function between the laboratory areas and the lecture hall areas was made and is reflected in the building plan.

Because of site limitations and for budget reasons, every effort was made to contain the required facilities



Elementary laboratories, the library and lecture halls occupy the first floor of the new building designed by the Office of Douglas Orr. These areas receive the largest numbers of students.

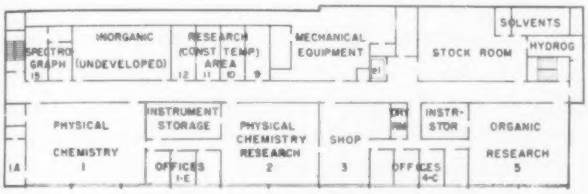
within the minimum space consistent with the most workable relationships among the several areas. Advanced laboratories, seminars and offices occupy the second story of the laboratory wing, while elementary laboratories, library and lecture halls, all of which serve the largest groups of students, occupy the first floor. The ground floor consists of advanced laboratories, faculty research offices, other laboratories and shops.

In the laboratory wing, stockrooms are located on each floor to provide convenient service to the various laboratories. A combination passenger and freight serv-

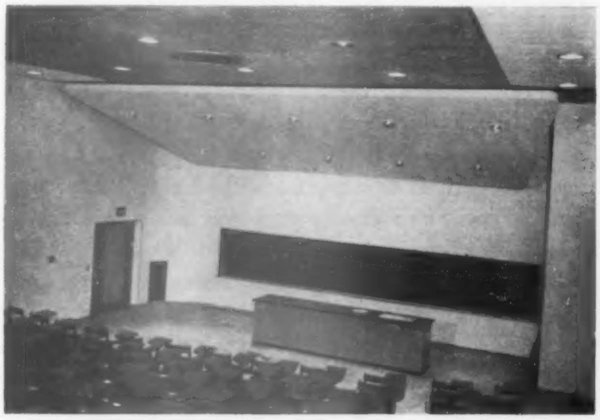
ice elevator is located adjacent to the stockrooms. Supplies are received at a loading dock at the first floor level. Stockrooms are equipped with automatic sprinkler systems for fire protection. Storage facilities for volatile solvents and for hydrogenerator equipment are provided with blowout type windows for protection of the building. Experimental research facilities on the ground floor are near a service passage. A ventilation shaft to the roof is for the future installation of piping and duct work necessary for research in radioactive materials or other specialized fields.

Lecture Room Arrangements

The lecture rooms are arranged in a compact pattern with special provision in the design for the acoustic properties of the rooms. Reflective ceiling panels of plaster over the lecture tables and acoustic absorbing panels on ceilings and rear walls enable a maximum ease in

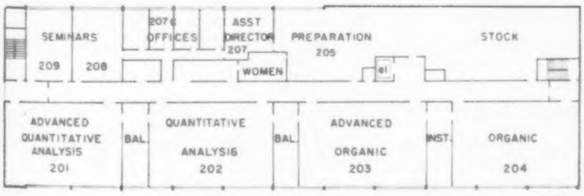


The ground floor houses the faculty research offices, other laboratories and shops.



This is the largest of three lecture rooms in Cleveland Hall. The table has a sink and hood.

Advanced laboratories, seminar rooms and offices occupy the second floor of the school.



speaking and hearing in these areas. A concrete floor, raised in steps throughout the seating area, facilitates observation of the demonstration lecture table.

Since the lecture rooms will be used for a variety of purposes, they have plastered walls and ceilings with paint finish. Corridors in the lecture wing have acoustic tile ceilings to reduce the noise level in these areas of concentrated traffic.

The chemistry lecture rooms are designed particularly for chemistry demonstration and are both served by one preparation room. The physics lecture room is tied directly to the existing physics laboratory through the preparation room. Facilities for an electrical cross connection between lecture room and laboratory areas are provided.

The laboratory wing of the building is of full fireproof construction, with concrete frame, floors and sidewalls for economy of structure and finish in one operation. The lecture wing was framed in steel because of the greater spans involved, with fire protection consisting of fireproof plaster ceilings and masonry dividing walls between areas.

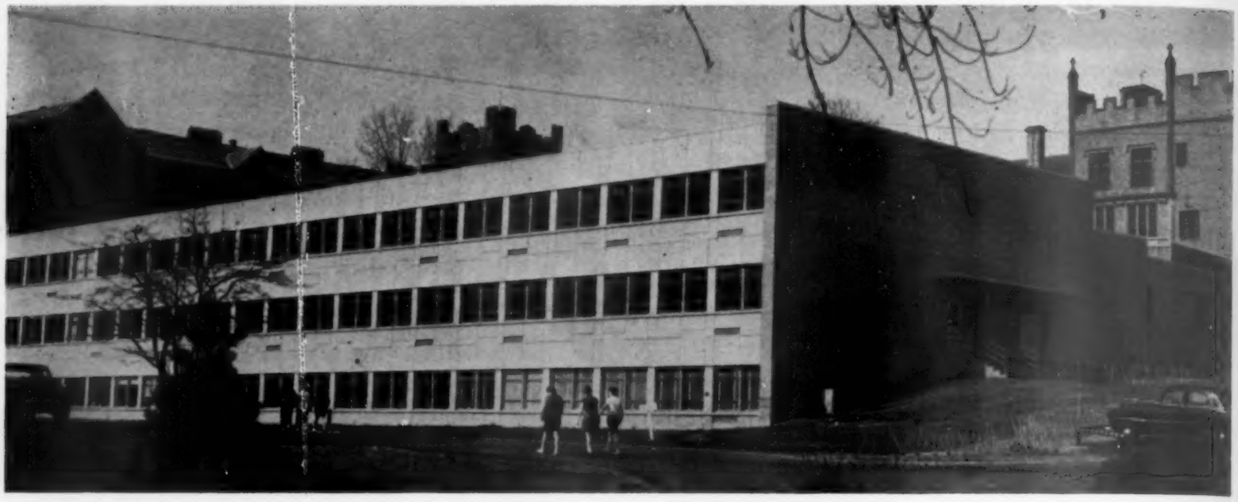
Selecting the Materials

Materials for the entire building were selected with an eye toward maximum economy of initial cost and maintenance. To this end, the long exterior walls of the laboratory wing are of painted concrete and steel sash. End walls of this wing and walls of the lecture wing are brick-faced to blend architecturally with the adjacent buildings. Roofs are flat deck construction with built-up roofing to save the extra cost of unusable attic space. Small penthouses on the roofs house the necessary fans for the exhaust and supply air systems and laboratory fume hood exhausts.

Interior finish throughout almost the entire laboratory wing is structural glazed facing tile. This one material has two purposes; it forms partitions and becomes the finished wall at the same time. Standard grade tile was selected to save money over costs of the select grade, more commonly used. It was felt that, in most locations, laboratory equipment hid a large portion of the wall and the minor defects occurring in the standard grade could be located on the wall side covered by equipment. Careful selection of material by the contractor has resulted in a very satisfactory installation. The minor defects inherent in this material are essentially unnoticeable in the finished work.

Throughout the building, corridor floors have been finished in vinyl asbestos tile for a minimum of maintenance in the heavily traveled areas. Work spaces have concrete floors treated with a clear dustproofing compound.

Piping services for laboratory areas are distributed horizontally in the ceiling of the ground floor and ver-



The turreted physics laboratories at the rear form a backdrop for the newness of Cleveland Hall and Chemistry Laboratory. The physics building, Shattuck Hall, was completed in 1932. Cleveland Hall was completed in September, 1954.

tically to the upper floors through pipe shafts located between the major laboratories. Branch lines at the ceilings of the laboratory rooms are grouped near the corridor wall to provide minimum length of run and to be less noticeable.

Chemical fume hoods are equipped with stainless steel exhaust ducts which are run vertically, where possible, to fans in the roof penthouse. Short horizontal runs of this ductwork were sometimes necessary to connect the various laboratories with the penthouse locations. Type 316 stainless steel was selected to obtain maximum corrosion resistance, and because ducts of metal require less shaft space than non-metallic piping.

Research laboratories on the ground floor are served mechanically through a pipe service tunnel underneath the laboratory floors. The tunnel location was established here for pipe access to the general laboratories and combination office-laboratory rooms throughout this floor area.

Finished ceilings have been omitted in the laboratory wing, both to save the cost of the installation and to provide access to the piping and duct services which are run in the ceiling space. The pipe service tunnel under the ground floor is also easily reached for maintenance and rearrangement of services. Lighting fixtures in the corridors are of a type selected to throw light down against the walls and floor and thus make the mechanical distribution systems in the corridor ceilings less conspicuous.

In laboratory rooms unit ventilators at the exterior walls supply tempered air for general ventilation and for make-up of air lost through chemical hood exhaust systems. Simple fin tube radiation along exterior walls provides the balance of the heating necessary for the building. Laboratory lighting fixtures are fluorescent with louvered frames for evenly distributed high level light distribution within the rooms. Experiments showed that "warm white" colored tubes provide the color balance necessary for laboratory purposes.

Lecture rooms are generally lighted with recessed down lights. These permit high level lighting on tablet arms for note taking without raising the light level in the room to an objectionable degree. Concentrated lighting of the lecture demonstration table and the instructor's chalkboard focuses attention upon these areas. Rheostatic control of the ceiling lights enables enough vision for note taking during periods when rooms are darkened for slide and film projection.

New laboratory furniture of flush hardwood construction was furnished throughout the bulk of the areas, but a certain amount of reconditioned equipment was moved from the old laboratory building.

Meeting the Department's Needs

Construction on Cleveland Hall and Chemistry Laboratory was carried out with a minimum of difficulty and was produced on schedule within the estimated budget cost figures. It is believed that the building incorporates all features desired by the laboratory in an arrangement convenient for use and accessible for maintenance, expansion or alteration to meet the changing needs of the Chemistry Department.

The New Orleans Medical Center includes: 1. Tulane University School of Medicine; 2. Charity Hospital; 3. Louisiana State University School of Medicine; 4. Veterans Administration Hospital. The School of Medicine for Louisiana State University was designed by Perez and Associates of New Orleans.

EXPANSION AND GROWTH OF THE SCHOOL OF MEDICINE, LOUISIANA STATE UNIVERSITY

by WILLIAM W. FRYE

Dean and Professor of Tropical Medicine, School of Medicine, Louisiana State University, New Orleans

Dr. Frye has a B.S. degree from Iowa Wesleyan College, an M.S. and Ph.D. from Iowa State College and an M.D. degree from Vanderbilt University School of Medicine. He was associated with the Vanderbilt University School of Medicine from 1931 until 1948 in various positions from research assistant to professor and head of the Department of Preventive Medicine. He was assistant dean of the Tulane University School of Medicine for one year. Dr. Frye accepted his position at Louisiana State University in May, 1949.

BECAUSE of its unique position and methods of education, the present day school of medicine exemplifies more specifically than any other unit the university's overall mission of education, research and service. In the medical school these three functions are closely woven into one in an attempt to meet the school's primary responsibility, that of training young men and women for the practice of medicine. None of these functions remains static. New discoveries resulting from research must be added to the medical curriculum and to the growing services needed. Each step forward increases the responsibility of the university and of the medical school.

Louisiana State University owes its origin to certain grants of land made by the Government of the United States in 1806, 1811 and 1827, "for use of a seminary of learning." The State Constitution of 1845 provided for the sale of these lands and for the establishment with the proceeds of such an institution. In 1848 a Board of Visitors was appointed whose duty it was to draw up a course of study, arrange for the accommodations of students and engage a superintendent and faculty. The first site of the university was in Rapides Parish, some three miles from the present town of Alexandria and its first superintendent was William Tecumseh Sherman.

The Louisiana State University of Learning registered its first students, nineteen in number, on January 2, 1860. Immediately upon the outbreak of the War Between the States, the superintendent resigned to enter the Union Army and most of the students and faculty left to enter the Confederate Army. When the Red

Industrial Photos

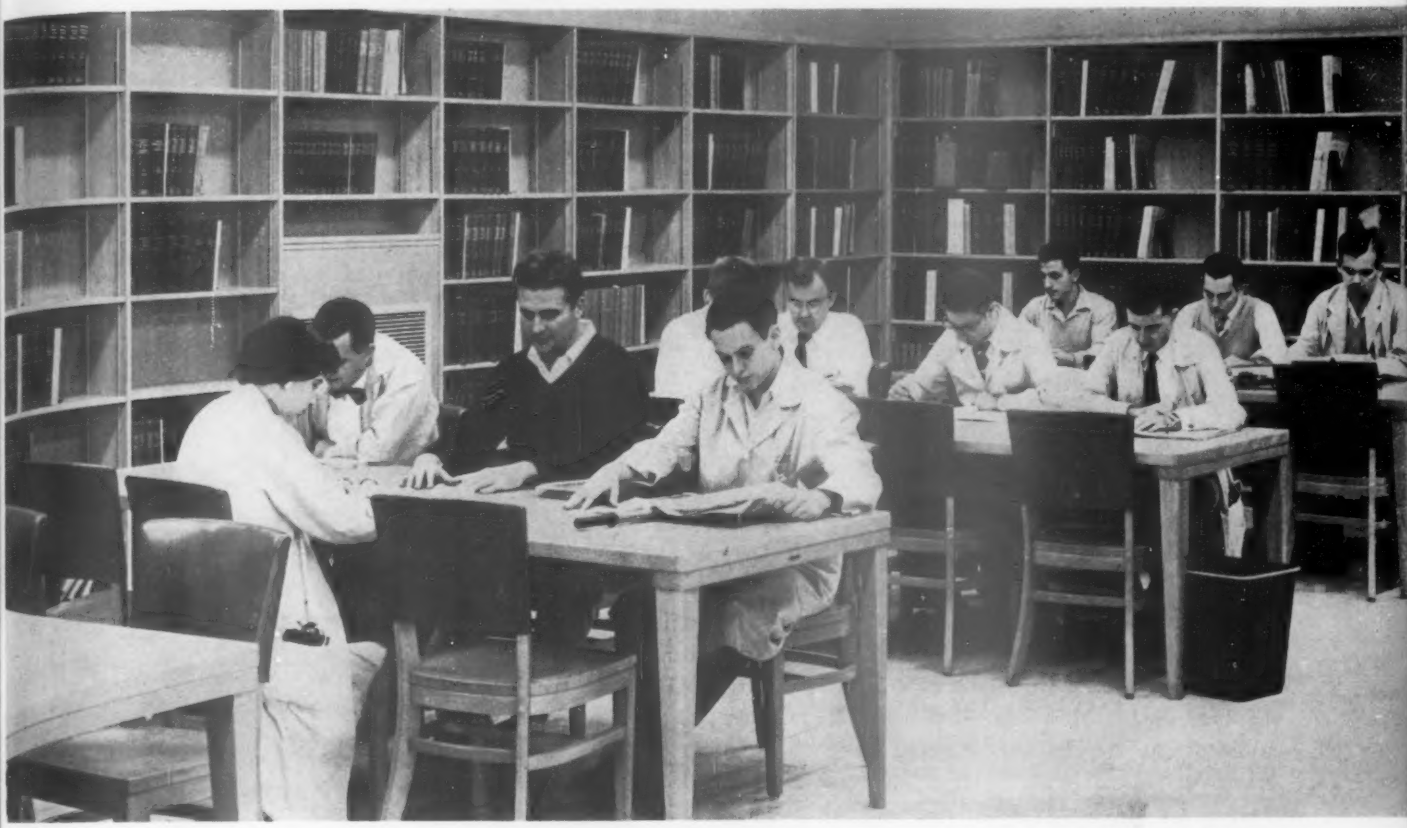
The increased physical plant at the Louisiana State University School of Medicine provides space for an enlargement of the teaching staff.

The biochemistry research laboratory of the Louisiana State University School of Medicine is also available for teaching purposes.

River Valley was invaded by the Union Army in the spring of 1863 the Seminary of Learning closed its doors.

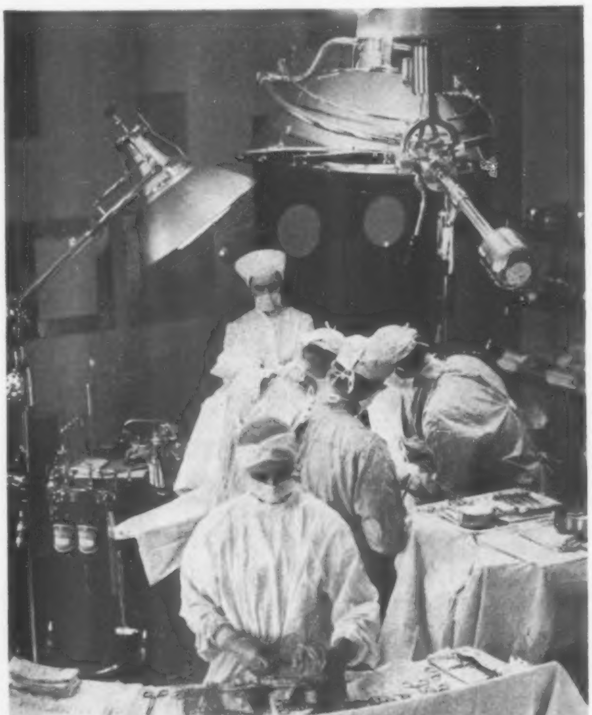
Academic Work Resumed

Academic work was resumed on October 2, 1865, under the direction of Major David French Boyd, who had been appointed acting superintendent in May of the same year. In 1869 the seminary building was destroyed by fire, but activities were immediately transferred to Baton Rouge, where the main facilities of the university have been located ever since. In 1870 the name, Louisiana State Seminary of Learning, was changed by legislative act to Louisiana State University, and in 1877 the university at Baton Rouge was merged with the Agricultural and Mechanical College which had been opened in New Orleans in 1874. The two institutions, "united and constituted into one and the



The School of Medicine library is at last able to make all of its books and periodicals available for student and staff use. A large reading room is part of the space. Perez and Associates are the architects of the building.

The Departments of Medicine and Surgery, because of the new building, have expanded with larger staffs, more research activities and improved and modern teaching facilities.

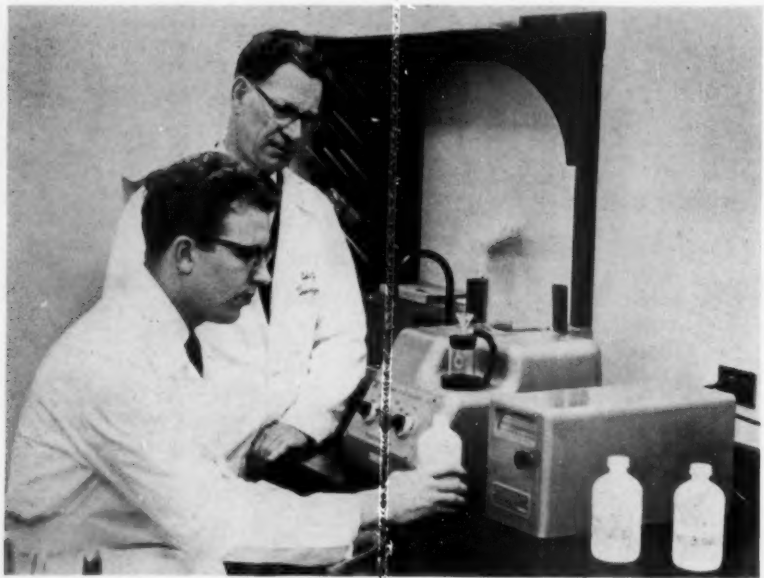


same institution of learning," began their joint operation on October 5, 1877.

Beginning of the Medical School

The Charter of Louisiana State University, adopted in 1877, provided for the establishment of a medical school. In 1931 a medical school building was completed adjacent to the Charity Hospital of Louisiana in New Orleans. During the construction of the building a medical faculty was organized and students were registered for the first time in the fall of 1931. Transfer students, admitted to the third year class, were graduated in 1933 and the first class of students who had completed all four years of their medical course in the School of Medicine of Louisiana State University was graduated in 1935. A total of 1,739 physicians has been graduated through 1955.

The eight story medical school building in which laboratory and didactic instruction was conducted was found to be inadequate almost as soon as the teaching program was well started. By 1940 the need for expansion of the physical plant was apparent. Moreover, the Council on Medical Education of the American Medical Association, following a routine survey, advised the university officials that the facilities for the number of students enrolled in each class in the School



Students are participating in a research project in the Department of Physiology of the School of Medicine.

of Medicine were inadequate. During the same year preliminary plans for an addition to the physical plant were prepared. But when World War II began in December, 1941, with the demand for an increase in enrollment, an accelerated teaching program to train more doctors and with a loss of faculty to the Armed Forces, the building program had to be abandoned.

More Facilities Are Needed

Following the war the demand for more doctors—and the demand of young people who wanted to become doctors—could no longer be met without additional physical facilities. The faculty had been depleted during the war years. It was also evident that the quality of faculty and students who are attracted to an institution and the character of their instruction and research were dependent to an important degree upon the facilities which are available for their use.

In 1949 the faculty of the School of Medicine agreed to increase from 100 to 125 the number of students admitted to the first year class. This was done with the understanding that additional space would be provided within the next four years. The 1950 Legislature voted a six million dollar bond issue for the university and gave top priority for construction of a new addition to the original building of the School of Medicine.

Almost two years of careful thought and planning were required before work on the new wing was started late in 1952. During the construction of the new wing and remodeling of the old building, serious problems were encountered. However, with the complete cooperation of students and staff the quality of teaching and basic research did not suffer. The major effort of the school had to be limited during this period to basic and essential activities.

The new addition was completed and ready for occupancy for the fall term of 1954 and the building was dedicated and formally opened on Alumni Day, November 26, 1954. The total cost, which includes some remodeling of the old building and basic laboratory, classroom and office equipment, was $3,500,000.

The Department of Microbiology now has three times its former space in the school. Virus research is being conducted in one of the laboratories.

A New Era Begins

With the completion of the new wing a new era has begun. The working space for the School of Medicine has been doubled, with an additional 100,000

The new auditorium permits a general assembly of the entire student body. It is also used for graduate and postgraduate instruction.

square feet of floor space, and provides for the expansion of all departments and for additional teaching and research facilities in departmental and interdepartmental activities.

Much Expansion Possible

What will this new and enlarged facility mean to Louisiana and to the South? It will, of course, mean more doctors. In fact it already has. Members of the first enlarged class, admitted in anticipation of new facilities, were graduated in 1953. But even more important is the quality of teaching and research. Our faculty will be able to do a better job of teaching at the undergraduate, graduate and postgraduate levels. We will be able to give more assistance to practitioners, hospital and public health agencies, and to expand and improve an already extensive and ambitious research and teaching program.

The original medical school building was designed for a large part time staff, with few facilities for an adequate full time faculty or for research. The accent during that time was upon classrooms and teaching laboratories. But medicine cannot be taught in classrooms and laboratories alone. Students learn best by first-hand observation and supervised practice. Medical education requires much more personal supervision and instruction than any other field of education.

Larger Teaching Staff

The enlarged physical plant at the Louisiana State University School of Medicine provides space for an expansion of the teaching staff, making possible more individualized instruction. The additional facilities have also helped to stabilize departmental staffs and to attract outstanding teaching and research personnel with good working conditions and adequate research opportunities. The entire plant, both old and new sections, is now completely air-conditioned.

The new addition has meant the installation of special equipment. An example is the electron microscope which was purchased with funds obtained from the United States Public Health Service through its Research Grants Division. These funds were part of a research grant, dealing with fundamental cellular

The Department of Pharmacology has been remodeled and completely equipped according to the specifications of the head of the department. The department, itself, has been reorganized.

studies conducted in the Department of Anatomy.

Another is an electroencephalograph used in the diagnosis of various brain and central nervous system diseases, and for research in the fields of neurology and psychiatry.

The Biophysics Laboratory

Space formerly occupied by the library has been remodeled and is now a biophysics laboratory, a completely new unit of the School of Medicine. This laboratory is designed for the study and handling of radioactive materials used in teaching and research and for our overall program of research in biophysics as it relates to medicine. The use of some of the new radioisotopes has been limited in the past due to the lack of approved and adequate laboratory space.

Also included in the new structure are facilities for housing animals used in research studies which formerly had been either abandoned or severely curtailed due to lack of space. Now, in all areas, students are participating with the staff in basic research programs.

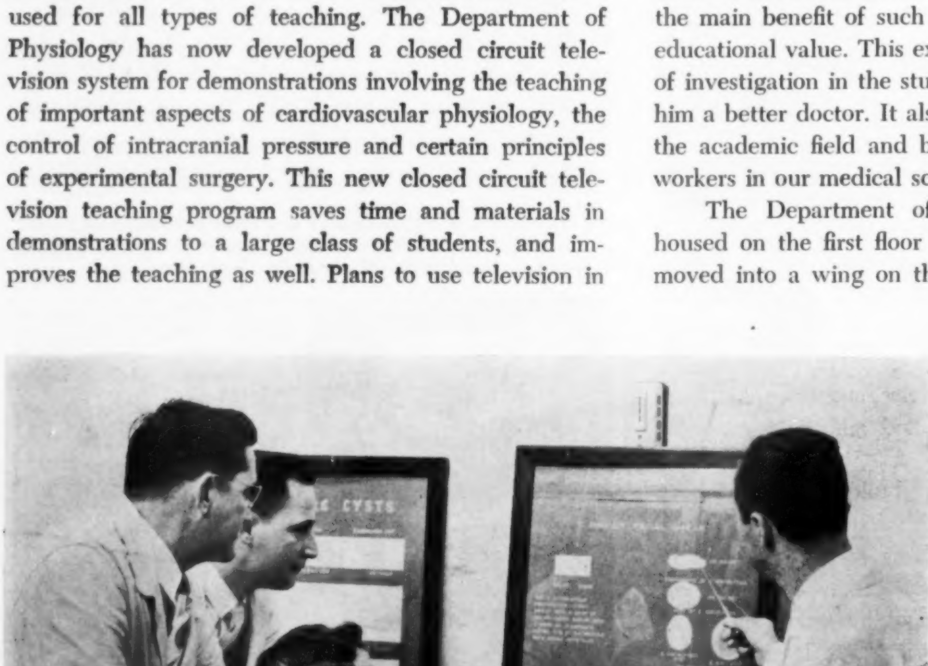
Built into the new addition is necessary wiring for the future installation of color television, which can be used for all types of teaching. The Department of Physiology has now developed a closed circuit television system for demonstrations involving the teaching of important aspects of cardiovascular physiology, the control of intracranial pressure and certain principles of experimental surgery. This new closed circuit television teaching program saves time and materials in demonstrations to a large class of students, and improves the teaching as well. Plans to use television in biochemistry for demonstrations have been made for the coming year.

The new wing has also made possible the consolidation of departmental activities and a grouping together of allied departments. Originally, the bacteriology and parasitology units of the Department of Microbiology, for example, were on the third and eighth floors, respectively. Even after becoming a separate department in 1947, microbiology continued to be divided. Now the department is unified on one floor of the new wing with three times its former space, and is adjacent to allied units, the Departments of Pathology and Public Health and Preventive Medicine. Combined office and research laboratories have been a feature of the new wing. This arrangement saves space and equipment.

Students Take Part in Research

Additional teaching and laboratory space also enables a step-up in our graduate education program, and supplies space for more of our medical students to gain experience and take part in research projects in the various departments. Aside from the practical contribution the student makes to the overall research program, the main benefit of such student participation is in its educational value. This experience develops an attitude of investigation in the student which will help to make him a better doctor. It also encourages some to go into the academic field and become teachers and research workers in our medical schools.

The Department of Pharmacology, which was housed on the first floor of the original building, was moved into a wing on the fourth floor. The area was



A variety of teaching aids are provided for use in the instruction of students in parasitology and tropical medicine.

The auditorium of the School of Medicine also has a balcony for additional seating and a projection room.

completely remodeled and equipped according to specifications prepared by the new professor and head of the department. The department has been completely reorganized with five full time staff members. We now have an active research program covering several aspects of pharmacology and a completely revised and expanded teaching program.

A larger staff, in addition to providing better instruction and research, will also aid the School of Medicine's expanding program of public service. The new 650-seat auditorium offers facilities for a general health education program for the average citizen. Health forums are now being conducted in cooperation with local health agencies. Our first health forum on heart disease attracted an audience of over 500 interested persons. The auditorium permits a general assembly of the entire student body. It is also used for graduate and postgraduate instruction in the School of Medicine.

A patient is examined in one of the newly organized and expanded clinical departments of the Louisiana University School of Medicine.

The Clinical Departments

The clinical departments have been reorganized and have additional space; research and teaching laboratories were added in each department. During the past five years the Department of Neuropsychiatry has been developed as a full time major department. A full time professor, as head of the department, was added on March 1, 1950. Since that time a full time staff of psychiatrists, neurologists, psychologists and a psychiatric social worker has been employed. During the past year the name of the department was changed to the Department of Psychiatry and Neurology. A new and completely reorganized program of teaching, research and service in neurology has been added during the past year.

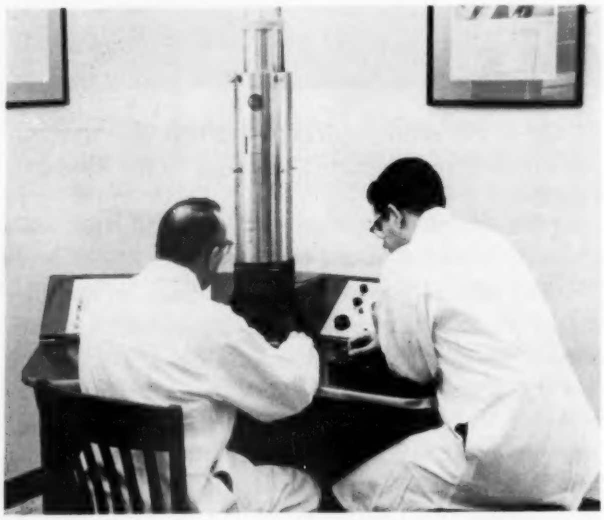
The Department of Obstetrics and Gynecology has a new head as does the Department of Pediatrics. These two departments are developing new research programs and are building a full time staff. A more closely integrated teaching program has been developed in all clinical and basic science departments. The Departments of Medicine and Surgery have expanded both in staff and research and in teaching facilities.

Postgraduate Teaching Program

At the present time a progressive and active postgraduate teaching program, directed toward the assistance of the general practitioner, is being conducted. We hope to expand and develop this program of teaching for all groups as rapidly as possible.

For the first time in many years the School of Medicine library is able to make available all of its books and periodicals for students and staff use. Before moving into the new library quarters, roughly four times as big as the old library, half the book collection had to be stored. Only about 40 persons could crowd into the old reading room at one time. The main reading room and three smaller rooms of the new library can comfortably accommodate about 150.

Hand in hand with providing more and better trained physicians must go a strong and progressive program of nursing education. Since 1931 Louisiana State University has been preparing nurses for teaching, administrative and supervisory positions in hospitals and in schools of nursing. Now, in an effort to help alleviate the great shortage of bedside nurses, the university, on the recommendation of an outstanding consultant team, is expanding its program to include two new programs of study. One of these will be a four-year basic nursing curriculum for high school graduates, and the other a general nursing curriculum for graduates of three-year hospital schools of nursing. Both of these programs lead to the degree of Bachelor of Science in Nursing.



Latest equipment in the School of Medicine includes the electron microscope employed by researchers in the anatomy research lab.

The cafeteria, located in the basement of the new wing, provides a long needed service for both students and staff.

With the new building, an increased budget and an enlarged teaching and research staff, we are accepting a new challenge. Changes which have taken place in medical education over the years are only a reflection of the changing cultural, social, economic and scientific conditions which have followed an evolutionary rather than a revolutionary pattern. This pattern we hope to follow in the future. The challenge of unsolved problems and future needs in medical education must be recognized by individuals who will do something about them. Our problem today is to identify, strengthen and develop those trends in medical education and medical science which best serve the needs of the people.

Today's medical school is far more than just an educational institution. It is a complex center for the promotion of medical sciences, for the development and coordination of research, teaching and service to the patient and to the community as a whole. One of our functions is to assist the practicing physician in keeping pace with scientific developments in the fields of diagnosis and treatment. We, as a medical school, must bring to the physicians who are engaged in medical practice the newer methods and technics which will make it possible for them to give the best possible medical care to their patients.

While we must constantly strive to improve our overall teaching, research and service programs, we must never lose sight of our primary function, which is undergraduate teaching or, better still, assisting in the preparation of physicians to enter the practice of medicine. Dr. Edgar Hull, our Associate Dean and Professor of Medicine, has expressed our objectives in this statement: "We propose to graduate only one kind of doctor —a good doctor."

A Faculty Dedicated to Service

We, of the Louisiana State University School of Medicine faculty, along with all other medical faculties, have dedicated ourselves to the promotion of medical education, and individually and collectively we are responsible for the shaping of the destiny of the individual students and thus the destiny of our profession.

The Louisiana State University School of Medicine is attempting to supply the type and caliber of medical education and medical care which will be of greatest service to the people of the State of Louisiana and the nation. Our services to the State of Louisiana are primarily those related to the training of young physicians, nurses and others who will supply the health and medical care needs of our modern society.

A reluctant patient in Kansas State College's new Dykstra Veterinary Hospital retreats as Dr. James Cowan tries to remove him from the dryer after a bath. At the time the building was designed John Brown was the state architect for Kansas.

DYKSTRA VETERINARY HOSPITAL AT KANSAS STATE COLLEGE

by CARL ROCHAT

Director, Kansas State College News Bureau, Manhattan, Kansas

A 1940 journalism graduate from Kansas State College, Carl Rochat worked on newspapers in Kansas and Illinois before entering the armed services in 1942. Following World War II, he attended Eastern Illinois State College and received his M.S. degree in journalism from the University of Illinois in 1948. Mr. Rochat joined the Kansas State College staff as director of the news bureau after nearly five years as editor of the Gonzales, Texas, Inquirer.

THE Dykstra Veterinary Hospital at Kansas State College, Manhattan, was completed in January, 1955, and was formally dedicated on June 2, 1955, in connection with ceremonies in observance of the fiftieth anniversary of the founding of the four-year curriculum in veterinary medicine. The building was named in honor of Dr. R. R. Dykstra, who served as dean of the school from 1919 until his retirement from administrative duties in 1948.

The Dykstra Veterinary Hospital undoubtedly is one of the most attractive structures of its type ever built. Interior walls are in pleasing pastel shades, and intern quarters on the second floor rival most dormitory facilities.

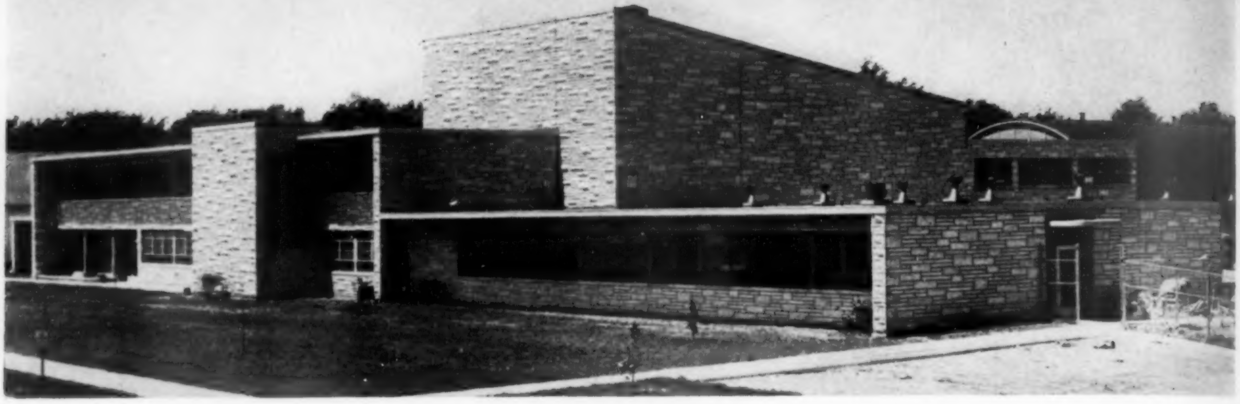
The hospital is essentially in two parts—a two story limestone main structure, facing the southeast, which houses the laboratories, surgeries, offices, student intern quarters, assembly room and classrooms, and a reinforced concrete structure which houses the stall portion of the hospital. There is a hayloft over part of the stall area. The building, which cost $575,000, is designed to house the department of surgery and medicine in the School of Veterinary Medicine at Kansas State College.

The Building's Main Floor

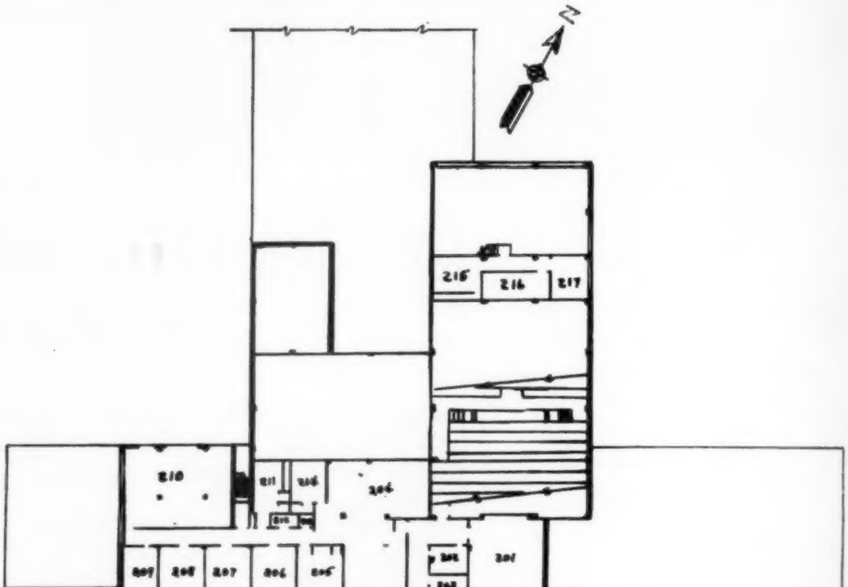
On the main floor there is a large waiting room with an adjoining business office, seven staff offices, two small animal examination and treatment rooms, two small animal surgery rooms, two student surgical exercise rooms, six special kennel rooms containing a total of 109 cages, a washer-drier room, the special foods preparation room and a record room.

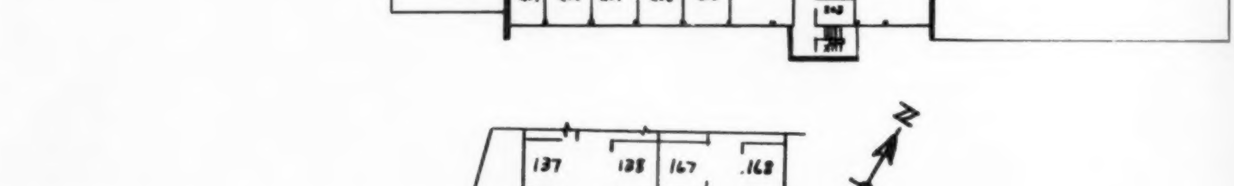
Situated between the areas where small and large animal work is carried on are the pharmacy, the X-ray room and a large pathology laboratory. These facilities are conveniently located for use by staff members working with large or small animals.

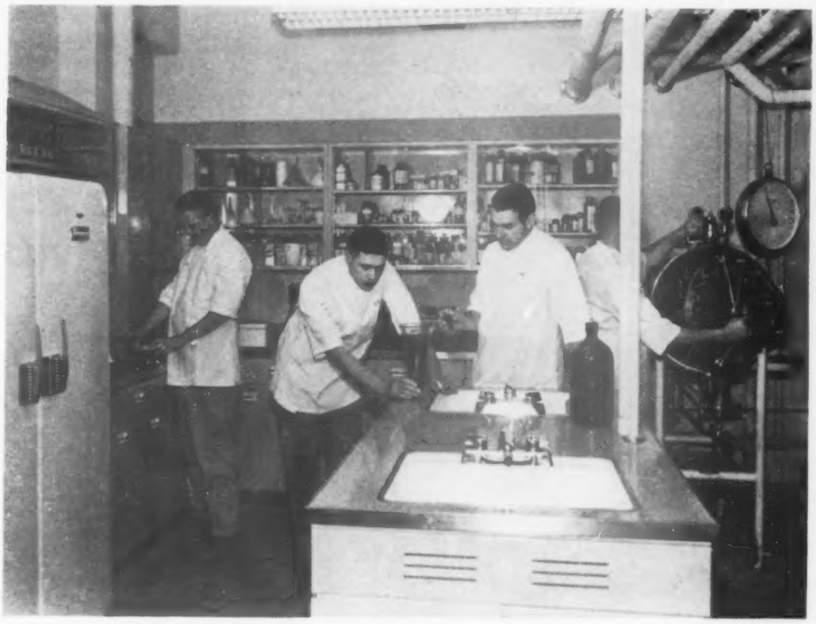
Of special interest on the first floor are the assembly room, the autopsy room and a special foods preparation room. The assembly room is of amphitheatre type and has an acoustically treated ceiling. It is



The veterinary hospital is faced with native limestone. At the rear of the building are located the stall area for animals and the hayloft. On the first floor, see plan below, are the diagnostic laboratory (177), the auditorium (175), large animal treatment room (125), post mortem room (174), doctors' offices (113-118), the business office (119), other surgery and treatment rooms, storage areas and numerous box stalls located at the rear. Rooms for the interns are on the second floor (206-209), see plan at right. Also on this floor are the interns' sleeping quarters (210), locker room (204), conference room (201), storage spaces, rest rooms and an office.







The pharmacy is situated between the areas where small and large animal work is carried on. The room is completely equipped for use by staff members.

fitted with 285 auditorium-type seats and has a screen and projector for visual education.

The autopsy room, one of the finest in the country, is located behind the auditorium and is connected with the hospital on one side only. Many windows make the room especially light and airy. It is equipped with a deep freeze, an electric carcass saw and an overhead monorail with three electric hoists for easy handling of cadavers.

The foods room is for the preparation of special diets for small animals. It has a steam cooker, deep freeze, refrigerator and a mixing table.

On the Second Floor

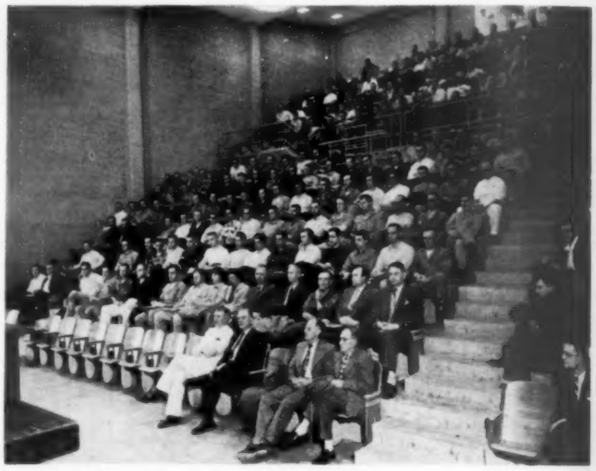
On the second floor of the main building are a conference room with a cable installed for color television, and student locker rooms with 150 lockers and quarters for 16 interns, including special study rooms.

Most of the rooms have salt glazed tile wainscoting and in the surgeries the tile is carried to the ceiling.

One of the two small animal surgery and treatment rooms in Dykstra Veterinary Hospital at Kansas State College. A senior is performing an operation while a staff member supervises. Spotlights overhead make the work of the surgeon easier. Walls are of ceramic tile and the ceilings are plastered. Sterilization equipment is conveniently located in the center of the room.

Students and technicians are at work in the clinical pathology laboratory. Among the analyses carried out here are blood counts, blood analyses, blood tests for brucellosis, culture work, urinalysis and feral examinations.

The entire enrollment of the Kansas State College School of Veterinary Medicine can be accommodated in the large auditorium. The room has an acoustically treated ceiling and the latest equipment for visual education. A large entrance door at one side permits animals to be trucked or wheeled into the auditorium.



Downstairs walls are plastered, while upstairs the hadite blocks, which are used for all interior walls, are painted. Floors for the small animal laboratories and for the office space are asphalt tile, except for the kennel rooms, post mortem room and treatment rooms. Upstairs, the flooring is rubber tile.

There is fluorescent lighting throughout the main portion of the building, with four spotlights fixed above the operating tables for additional lighting. In the large animal treatment room, plastic dome lights supplement the natural light available.

The northern portion of the hospital contains forty box stalls for large animals, of which eight are heated for convalescent patients. Some of the stalls are equipped with single stanchions, and all have collapsible hayracks.

A portion of the stable area is covered with a hayloft designed to hold about 70 tons of hay and feed. Trusses are laminated wood arches, and the loft is equipped with a fire protection sprinkler system.

There are five unloading docks, with ample parking space for trucks and trailers. Two of the docks are so arranged that a farmer, bringing his animals in for vaccinations or some other special treatment not requiring much time, can unload the animals at one dock and load them right back on at a second dock as soon as they have been treated. This avoids unnecessary turmoil in the stall area. A ramp was constructed under the stall area so that manure can be dropped through a floor opening into a waiting truck to be hauled away daily.

Many Animals Are Treated

At Dykstra Veterinary Hospital approximately 30,000 animals are treated yearly by the Kansas State College staff. The new building provides the best of equipment and ample area for accommodating these treatments and also for housing the student enrollment in veterinary medicine.

Edwin Reed Lodge is one of the two new dormitories at Oregon State College. James L. Gathercoal of Corvallis is the architect of the buildings.

COOPERATIVE DORMITORIES FOR MEN AT OREGON STATE COLLEGE

by SAM H. BAILEY

Head of the News Bureau and Associate Professor, Oregon State College, Corvallis, Oregon

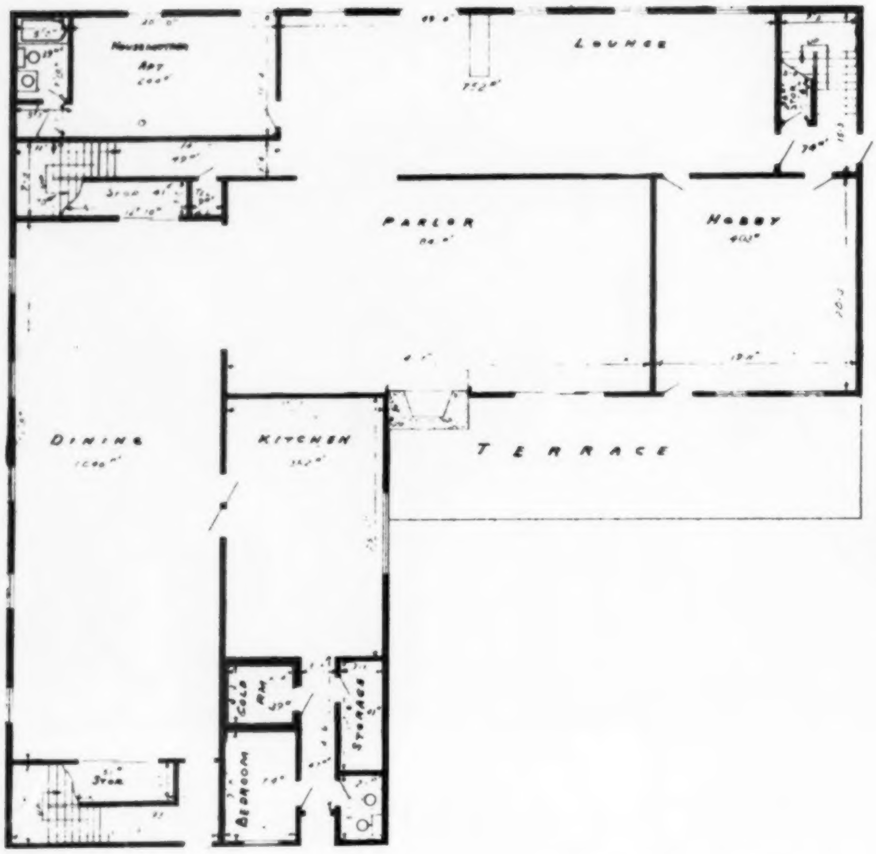
Mr. Bailey has been a member of the Oregon State College staff since 1947. Prior to that he gained newspaper experience on the Logan, Utah, *Herald-Journal*. He has also been a correspondent for various state and regional publications. Mr. Bailey has a bachelor's degree from Utah State Agricultural College and a master's degree from the University of Wisconsin.

TWO 60-man cooperative dormitories were built last year at Oregon State College which have attracted the attention of college housing officials across the country. The dormitories are designed with common sleeping quarters for the students, who must also share the housekeeping chores. The low-cost construction features of the units and the "homey" touch they add to group living have made them favorable buildings for reasons of economy and accommodation.

The total cost for the two brick veneer on wood frame buildings was $287,000. This amounted to $2,392 per student, substantially less than the construction costs of many other dormitories. The square footage in one of the units is 12,349; in the other the square footage is 13,432.

With basically the same interior features, the two units are varied in outside design to add individuality and avoid a "mass production" look. One building has a T-shape design. The other is L-shaped. Both are three stories high with the main floor devoted to the kitchen, dining room, living room, utility room, guest apartment for the housemother and a hobby room. The living room is adjacent to the dining room so the two areas can be opened for dancing or other large group social activities. Neither structure has a basement.

On the second floor are three-man study-living



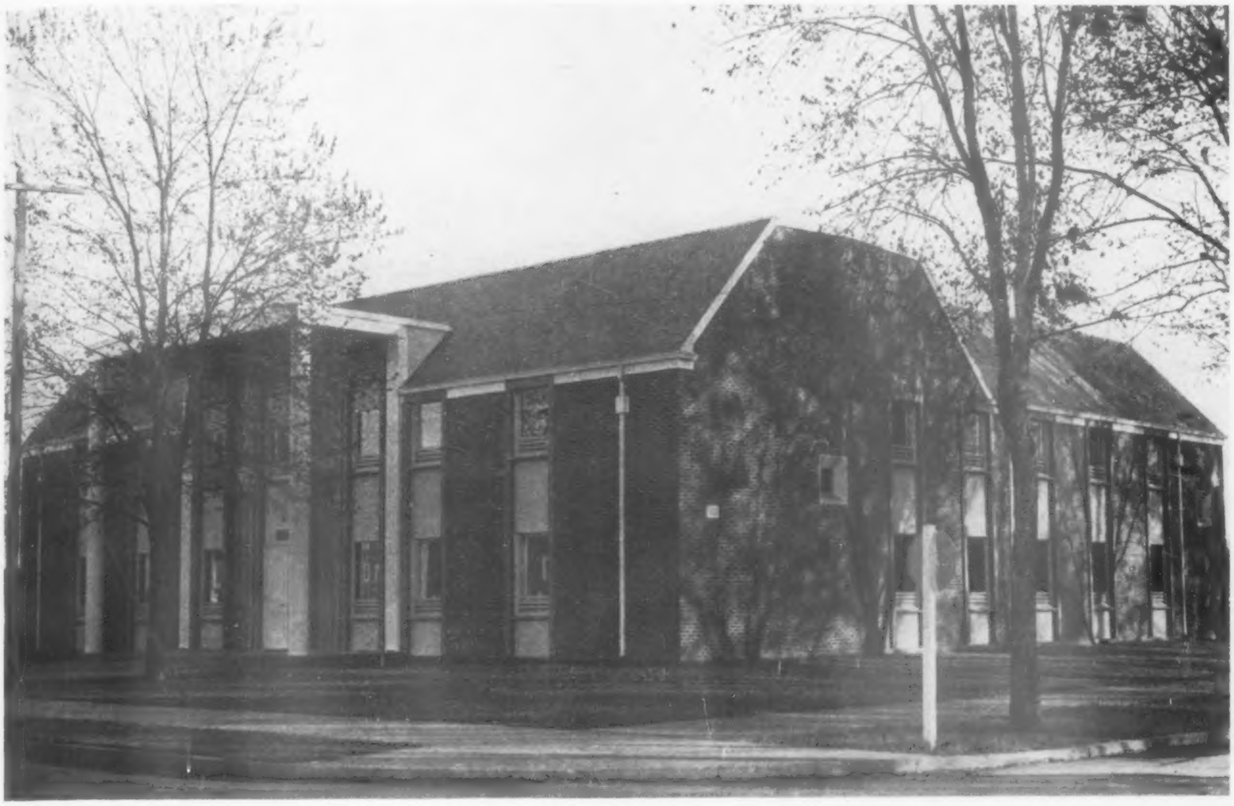
The first floor of Edwin Reed Lodge has the housemother's apartment, the dining room, kitchen, storage areas, the student lounge, parlor, hobby room and auxiliary areas. The parlor and hobby room open onto the wide terrace.

The group shower room, rest room and laundry area are located on the second floor of Edwin Reed Lodge. The remainder of the floor is divided into 19 study rooms. Each study room accommodates three men. The rooms have individual built-in desks, bookcases and wardrobes.

rooms, with individual built-in desks, bookcases and wardrobes. The wardrobes are placed back-to-back and serve as walls between the rooms. This cost cutting plan has proved to be successful and the clothing contributes to sound control. The wardrobes have an open area at the top for hanging clothes and three drawers at the bottom for folded items. The doors have built-in shoe racks and storage space for toilet articles.

One Large Sleeping Area

Sleeping quarters are in one large area on the third floor and consist of double-deck beds. A small



The third floor of Edwin Reed Lodge houses the large room which serves as common sleeping quarters for the men, the recreation room, and storage and utility areas. The building is a brick veneer on wood frame structure. The students who live in this building also share the housekeeping chores.

bathroom, luggage room and recreation room are also included on this floor. Washrooms, toilet facilities and showers are centrally located on the second floor. There is a separate laundry room with facilities for pressing clothes.

The men living in the dormitories do their own housekeeping, buy the food, plan the menus, assist in meal preparation and service, and employ what additional personnel are needed to perform the work. On this basis the students "cooperatively" cut their living expenses from ten to twenty dollars a month, as compared with costs in other dormitories.

Student officers are elected in each unit to direct group affairs. Last year the organizations proved to be

Furnishings for the interior of the dormitories were selected for their homelike and comfortable appearance. Each dormitory has living quarters for 60 men. These select student officers to direct group affairs.

Although Heckart Lodge is T-shaped, as opposed to the L-shape of Reed Lodge, it contains essentially the same facilities as the other building. The first floor has a dining room, kitchen, housemother apartment, reception area, lounge parlor and hobby room.

efficient and closely knit. When vacancies occur in the living quarters, the men in the dormitories nominate new members from a long list of applicants.

Additional Units Are Planned

The idea for the lodges stemmed in part from the success of Azalea House, a women's cooperative dormitory built in 1953 as a special project of the Oregon State College home economics extension council. Additional units are being considered for the future, according to Robert C. Koehler, OSC director of dormitories and Richard Adams, superintendent of the physical plant. When additional units are constructed, they will be patterned after the designs of the present men's units.

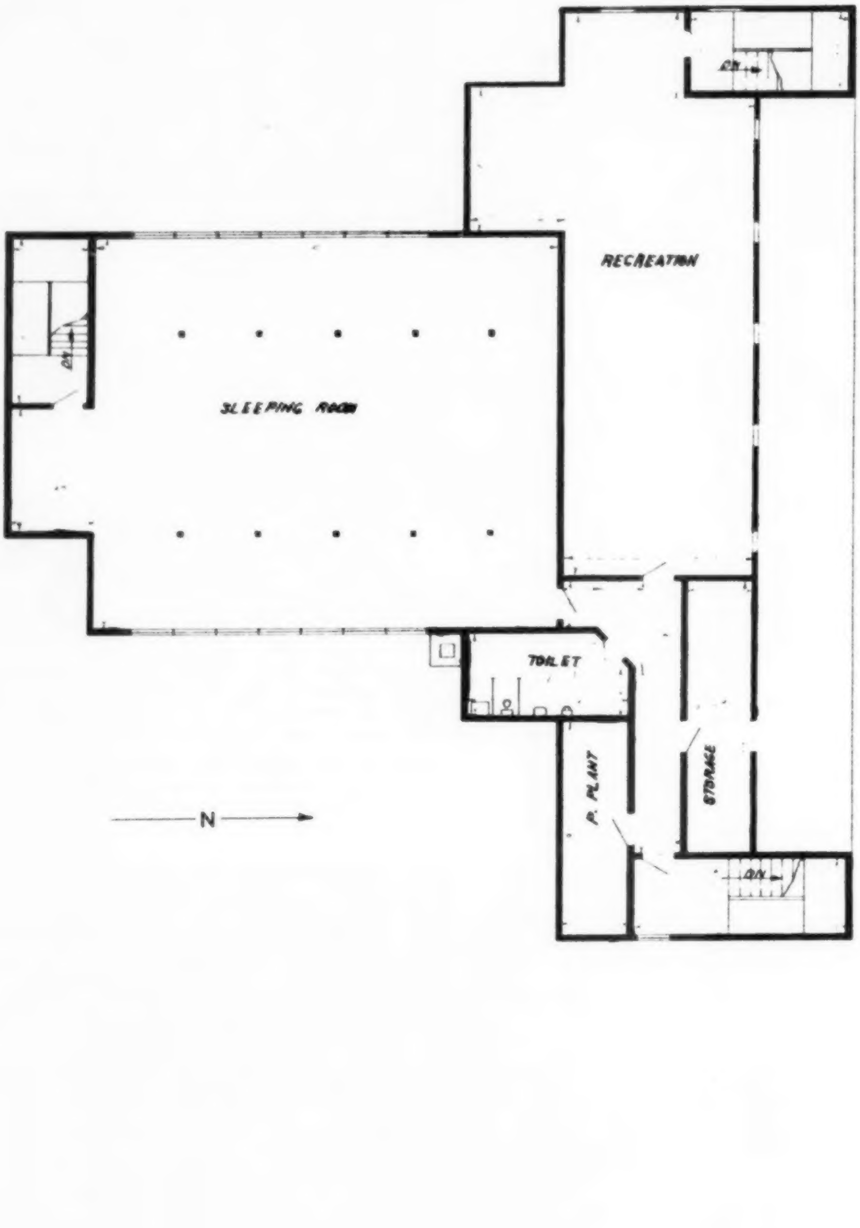
The buildings are known as Reed and Heckart

The second floor of Heckart Lodge has a laundry room, a large toilet room and nineteen study-living rooms. The wardrobes in the study rooms are placed back-to-back and serve as walls between the rooms. The doors of the wardrobes have built-in shoe racks and storage space for toilet articles.

The parlors of the lodges have fireplaces and sectional furniture arranged attractively about the rooms. Glass doorways lead to the outdoor terraces which are just outside.

Lodges. Reed Lodge was named for the late Edwin T. Reed, college editor at Oregon State College for 35 years. Heckart Lodge takes its name from Mrs. Zelia Heckart, who was campus "mother" to hundreds of students at her Corvallis boarding house before her death early in 1954.

James L. Gathercoal of Corvallis was the architect of the buildings. The contractors were as follows: H. L. Shields and Son of Eugene, general; Arnetts Oregon Ltd., Albany, mechanical; and the Pacific Electric Construction Company, Corvallis, had the electrical contract.



The power plant for Heckart Lodge is located on the third floor of the building. There are also a storage area, toilet and recreation room on this floor. The common sleeping room contains enough space for sixty students.

The new dormitories and related facilities for Rutgers University, the State University of New Jersey at New Brunswick, are located on a long narrow strip of river bank. The architects are Kelly and Gruzen of Newark, New York and Boston.

DISTINCTIVE DORMITORIES AT RUTGERS UNIVERSITY

by MARTIN L. BECK

Associate, Kelly & Gruzen, Architects, Newark, New York, Boston

Mr. Beck was educated at the Royal Institute of Technology, Budapest, Hungary, the Beaux Arts Institute of Design, New York, and, as winner of the Princeton Prize, completed his formal education at the Graduate School of Princeton University. He served as assistant professor on the faculty of the School of Architecture at Princeton from 1928 until World War II. From 1944–46 Mr. Beck was executive officer of the Office of Scientific Research, Princeton Station. Prior to joining the firm of Kelly and Gruzen, Mr. Beck was engaged in private practice in New Mexico.

"YOU have all heard or read a great deal about the 'impending tidal wave of students' now reaching the lower schools, soon to engulf the colleges. Lest there be any optimistic misapprehension, I want to point out that these new dormitories are not the answer to that problem. *They are needed right now,* for our immediate use. So are the classrooms; we have a big building deficit to make up here. We are full to the bursting point right now, and we shall occupy this additional space at once. The need for much greater expansion must still be met."

These comments were among the remarks made by Dr. Lewis Webster Jones, president of Rutgers University, when ground was broken for three new dormitory buildings and a student lounge. They pointed up the great problem of the shortage of space which has been confronting more and more schools of higher learning.

As one of the nation's oldest and yet most progressive universities, Rutgers, the State University of New Jersey at New Brunswick, is moving resolutely to meet the pressures of a fast changing educational scene and the special problems imposed on institutions with limited facilities for expansion.

The Need for Dormitories

Since the swelling enrollments of the two postwar periods, one of Rutgers' most acute needs has been for on-the-campus dormitory space both for students and associated groups. At the time the firm of Kelly & Gruzen was commissioned to design new dormitories, Rutgers was unable to place all of its students in existing campus quarters, including fraternities and dormitories. Approximately 500 resided in dormitories, another 570 in fraternities and 250 in off-campus dwellings in New Brunswick and vicinity.

Expecting that, during the next few years, enrollments at the men's colleges would exceed that of the post World War II period, Rutgers set out to assure itself adequate housing for all students. Also anticipated was the need for suitable housing for such groups as the American Legion sponsored New Jersey Boys' State, the Graduate School of Banking, the Graduate School of Sales Management and Markets and labor schools in

the summer sessions, which would use the facilities when the regular student body is on vacation.

The design of the new dormitory-classroom buildings and student lounge was aimed not only at providing Rutgers with urgently needed living quarters for students, but also at creating a group of buildings which would complement the existing campus and in turn become the focal point of the student body's social life and activities.

A Basic Planning Concept

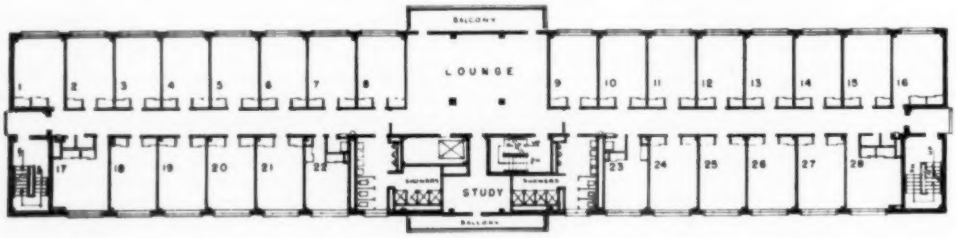
Throughout the planning of these residence halls, the architects approached the many problems involved with a concept that has become basic in present day educational building. This is the belief that today's student, no matter at what level, is a social being and that he functions best, academically, physically and socially, when he feels at home.

It has been said that a dormitory is to a university what a home is to a family. Just as the home owner looks for a convenient and economical structure which will provide a maximum of comfortable living space, so does a university in search of a dormitory. As families change in size, in personal tastes and habits, in economic standards and desires, so do universities.

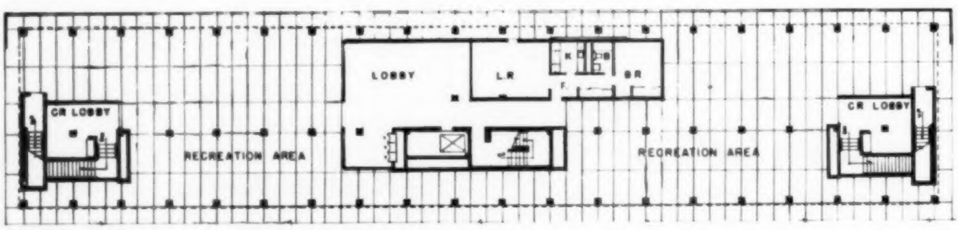
Because of the complexity of the problems confronting an educational institution and the long-term fiscal investment involved, the architect is obliged to project himself several generations ahead and at the same time he must, perforce, come forth with a finished building which is expressive of its own time and its social, economic, technological and aesthetic climate. So the architects, in their planning, endeavored to provide buildings which would fill every requirement for adequate and pleasant living quarters as economically as possible, and to provide buildings commensurate in character with the status and scope of Rutgers University.

Selecting the Site

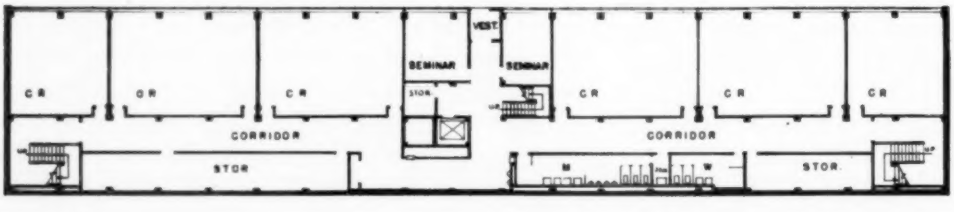
At the outset, the selection of a proper site for dormitories for 1,000 students offered some serious challenges. Original intentions to use parts of Bishop Campus were abandoned. It was felt that this campus



A typical dormitory floor contains a large lounge, the dormitories, a study, shower rooms and toilets.

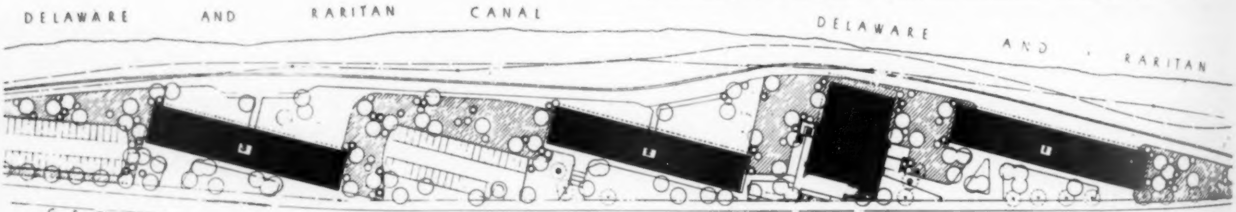


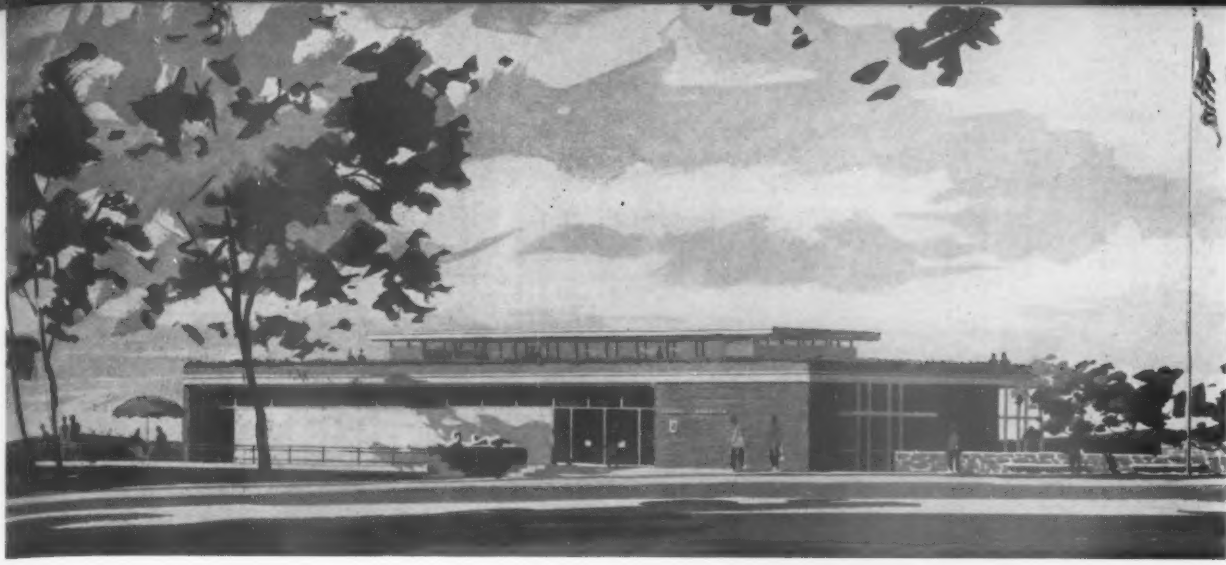
The ground floor has an open recreation area and enclosed lobbies and stairways. There are also a main lobby and an adjacent faculty apartment.



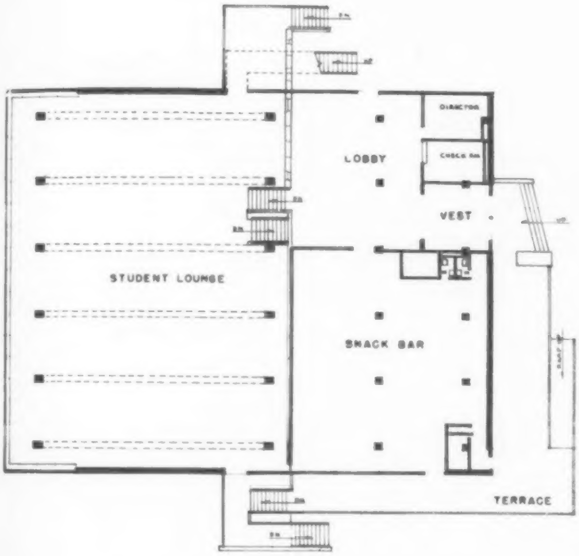
The classroom level faces the river bank and can be reached from the stair halls at each end of the open ground floor.

The buildings are angled to provide maximum sunlight for all rooms.

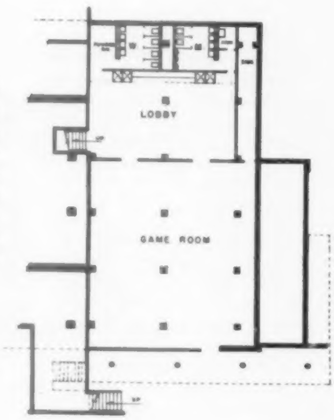




The student lounge for the dormitories at Rutgers University was incorporated into the scheme to provide a place for informal student gatherings and to provide added facilities for campus social li



The upper level (left) of the student lounge building has a large snack bar, the main lounge, lobby, vestibule, check room and director's office. The lower level (right) contains the game room. The roof of the building will be used as a sun deck.



should remain primarily an academic area; also, the program called for more housing than it was architecturally feasible to place in this area.

The site chosen for the dormitories was a fairly confined area on the river bank, a long narrow strip of some five and a quarter acres known as College Park. This area is bounded on the west by George Street, a principal traffic artery along Bishop Campus; and on the east by the Delaware Canal and the Raritan River, about forty feet below the George Street level.

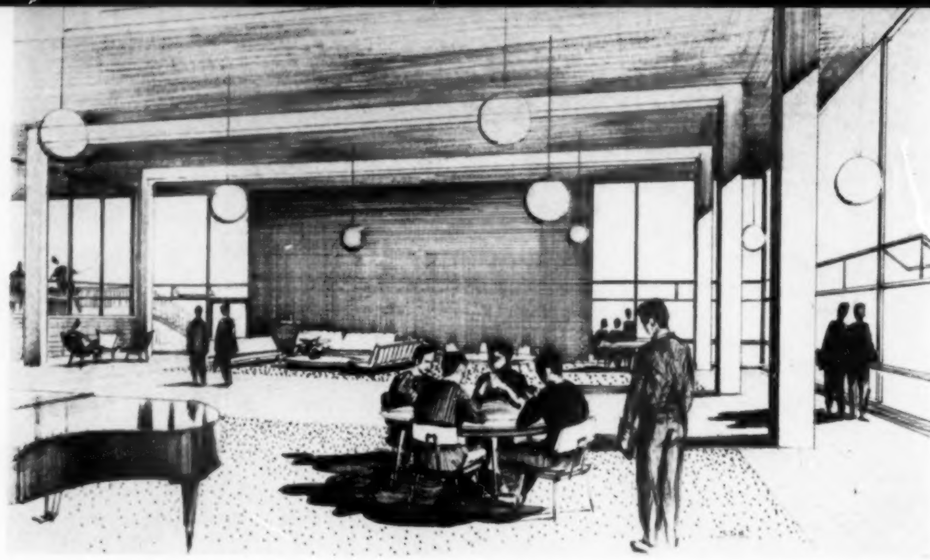
It is interesting to note that of the entire dormitory site only 18 percent of the land will be covered by buildings. The remainder is devoted to circulation areas, terraces on the lower level and the parking areas. Actually, by setting the dormitories upon columns, less than 7 percent of the site is occupied by enclosed space.

As a site, a river bank is always interesting, and the College Park area was considered almost ideal for location of the new dormitories. However, at the time of selection the site contained a number of wartime, prefabricated, barrack-type buildings which were being used as classrooms. There was some question as to how these classroom facilities could be replaced, since the need for them was just as great as for dormitories.

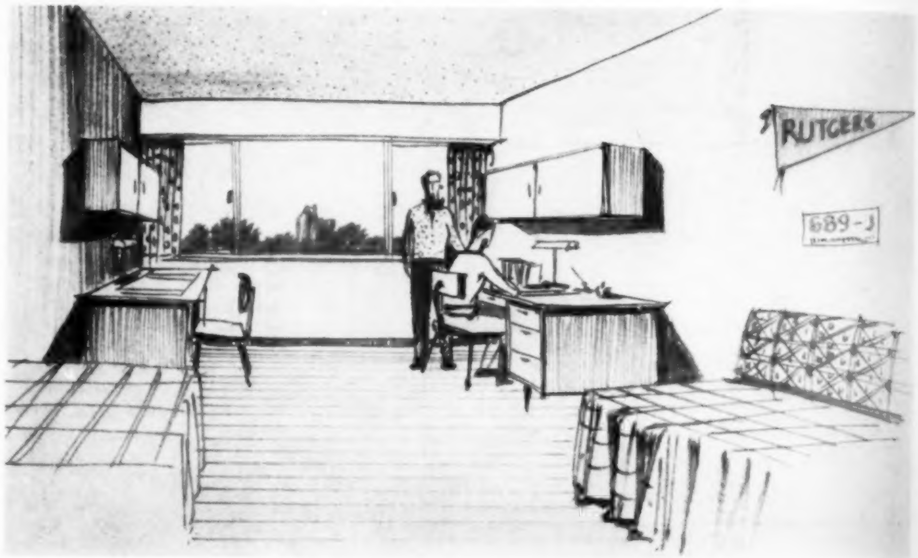
Orientation and Design

In the orientation and design of the dormitories, the architects wanted, of course, to take maximum advantage of the confined site. From the very first studies it was found to be possible to include classroom facilities in the scheme and also to locate them in an area which might ordinarily be considered the basement, hence unusable for such purposes. By cutting into the side of the canal bank to establish a two-story classroom section over which the dormitory proper will stand, Kelly & Gruzen arrived at the unusual combination of residence halls and classroom facilities, each to be developed as a separate unit, within common buildings.

Site restrictions also required that the dormitory buildings be angled to provide maximum sunlight for all rooms and to afford the best views possible of the



The main student lounge, 84 feet by 70 feet, has a glass wall which faces the river.



The student rooms are designed to accommodate two students each. Wardrobe spaces will be placed against the corridor wall for added soundproofing.

river on one side and of the campus on the other side.

The overall project will accommodate a total of 1,008 students and is to consist of three dormitory-classroom buildings, each 43 by 230 feet; and a student lounge building placed between two of the dormitories. Each dormitory building will comprise a six-story mass to be supported on free standing columns which will rest on the ground floor containing the entrances, and on a level with George Street. Below the ground floor, on the river side and cut into the canal bank, will be the two-story classroom sections facing the river. Two of the dormitories will contain two-story classroom sections; and one will have a one-story classroom section.

The Open Ground Floor

Setting the residence halls upon columns makes it possible to retain from George Street an extension of usable ground area and also a continuous view of the river and the beautifully wooded park beyond. Also, it creates open, terraced and paved areas which will bear the student traffic load and, at the same time, provide shelter from sun or precipitation. Another advantage in placing the first residence floor one story above George Street is to eliminate from student rooms the disturbing headlight glare of passing automobiles.

For the efficient functioning of each unit, it was deemed necessary that student circulation for the entire project should be carefully organized. Dormitory circulation could be channeled to and from George Street through the center of each building. Classroom circulation would then be directed through the ends of each building.

The Student Entrances

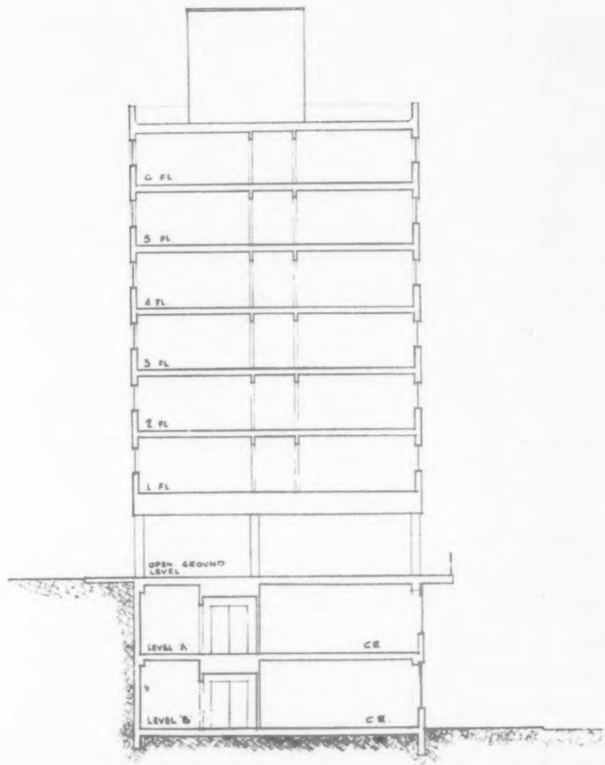
Principal student entrances to the dormitories will be at the stair and elevator core located at the center of each building, through a spacious lobby entered from George Street. The only enclosures along the ground floor level will be this main lobby in the center and an adjoining faculty apartment; and the stair halls at both ends of the building which lead down to the classrooms. With this open area and the view of the river, a sense of freedom and spaciousness is created which

will handle student traffic conveniently and, in fact, establish a distinct residential atmosphere for this part of the campus.

The Housing Divisions

Each building is divided into six "house units," one social unit for each floor accommodating fifty-six students. The typical plan of each dormitory consists of a central hall with rooms on both sides. In each "house unit" the student rooms flank the central core in which every unit will have its own lounge, approximately 23 feet by 35 feet in size, facing the river. In addition to the lounge, the core area will also contain a small study room. Open balconies will extend off the lounges and study rooms along both sides of the building exteriors, serving to enhance the general spaciousness of the entire core area. There will be an apartment unit in each building to house counselling personnel chosen from the faculty.

Student rooms are designed to accommodate two students, reflecting present trends in the planning of university residence hall facilities. Sizes of the rooms will be 11 feet, 6 inches by 17 feet, including wardrobe spaces placed against the corridor wall for additional soundproofing. A good deal of flexibility will be given



A section of the dormitory shows the two classroom levels, cut into the river bank, the open ground floor and the six levels of dormitories. Each of these six "house units" has its own lounge, facing the river, and a core area for the small study hall and service facilities. The open ground floor area facilitates student circulation for those who are traveling to and from the dormitories and the classrooms.

to the students in arranging the furniture supplied by the university.

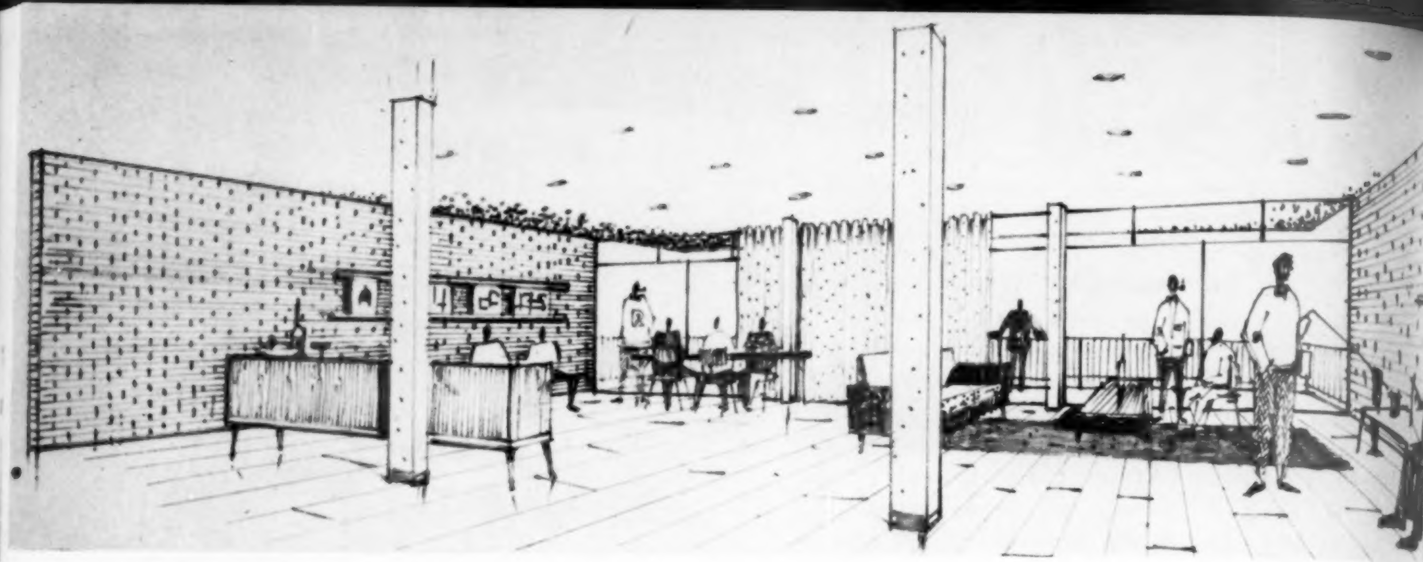
Centralized toilet facilities, linen storage and janitors' closets will also be located on each floor. Additional storage space for students' personal property will be made available in the basement. In keeping with the goal of making the student feel at home, all the colors, building materials and decor for the dormitory interiors will be chosen with great care to achieve this effect.

Classroom facilities in the dormitory building will consist of twenty-five classrooms and four seminar rooms. Total classroom seating capacity will accommodate 1,275 students. Several types of classrooms with varying capacities (e.g. seating 60, 45, 25 and seminars seating approximately 15 each) will afford sufficient flexibility to these areas for varied instruction.

Although the main approach to the classroom sections will be from George Street through the stair halls at each end of the open ground floors, there will be other means of entering the classrooms directly from the lower court level. All classrooms will face east.

The triangular shaped areas extending from the foot of the classrooms to the river and canal banks will be landscaped. Parking areas will be located at both ends of the project and between the two buildings at the north end. It is expected that these provisions, plus existing parking available across George Street, will be adequate to handle the immediate needs of the project.

The student lounge building was incorporated into



Each floor, or house unit, of the three dormitories has its own lounge. These lounges are approximately 23 feet by 35 feet in size. The rooms face the river and have their own balconies at each floor level.

the scheme to provide a needed place for informal student gatherings and to provide added facilities for social life on the campus. Located between two of the new dormitory buildings at the south end of the site, the lounge will be a three-level structure. Its main entry level, off George Street, will lead to the director's office, checking facilities and to a snack bar with a capacity for serving 180 students. The intermediate level, a few steps below, will house the principal lounge space—a spacious room 84 by 70 feet, with a glass wall facing the river. One half flight below the lounge will be the game room. The roof of the lounge building, reached by an outside stairway from the lobby terrace, will be available for use as a sun deck and will provide an excellent vantage point for views of the river.

Basic Construction Features

Construction of the dormitories will be of fireproofed steel frame, concrete floors throughout and cavity-type exterior walls with a brick facing complementary in color to other structures on the campus.

Cost of the overall project will total approximately four million dollars, less fees, landscaping and equipment. The first of the buildings is scheduled for occupancy by summer 1956, and the entire project is expected to be occupied and in use by mid-winter 1956–57.

To the best of the architects' knowledge this project represents one of the first of its scope in the country wherein classroom facilities are integrated with residence halls. Locating the major residence halls near the heart of the campus will reduce distances between classes and living quarters. The proximity of the new library, directly across the street, will also prove advantageous to the location of these new residence halls.

A Contemporary Approach

The adoption of a contemporary approach for a traditional campus represents, for Rutgers University, a step ahead towards achieving much needed facilities expeditiously and economically. The simplicity of the design of this project should contribute to an efficient and economical physical operation and maintenance and, above all, to the effective integration of social and educational life at a major institution.

In his groundbreaking remarks, Dr. Jones commented on Rutgers' reaction to the architectural concept of the dormitories:

"We are fully and thankfully aware of the usefulness of these new buildings; we shall, as they are completed, become increasingly aware and proud of their beauty. They have a beauty of line and mass, an imaginative adaptation of modern building techniques to their function and to this site, an honesty of style which expresses the spirit of our time. Our Old Queens building is beautiful for the same reason: it expresses the spirit of the late 18th century honestly, simply, with economy of means.

"I hope these new buildings will 'set a style' only in that sense—that any future buildings at Rutgers will always express the architecture of their own times, just as the university will strive to express the best in contemporary thought and practice in all fields of human endeavor. That has been the honored and traditional function of our universities—to preserve and build upon the wisdom of the past, but always with our eyes on its application to the present and the intelligent shaping of the future."

The steel shades of the new apartment building for married students are not only ornamental, but also serve to keep out the sun and rain. The firm of Wittenburg, Deloney and Davidson of Little Rock designed the building.

HENDERSON COLLEGE'S NEW APARTMENTS FOR MARRIED STUDENTS

by FLORENCE TURRENTINE

Director of Housing, Henderson State Teachers College, Arkadelphia, Arkansas

Mrs. Turrentine is a graduate of Henderson-Brown College. She was a public school teacher for a number of years before joining the staff of Henderson State Teachers College, Arkadelphia, Arkansas, as dean of women. This was in 1927. Mrs. Turrentine has been Director of Housing at the college since this position was created in 1952.

THE completion of the new thirty-unit Student Apartment House on the Henderson State Teachers College campus in Arkadelphia, Arkansas, is fulfilling a dream and meeting a necessity. Since the close of World War II, large numbers of students, especially ex-G.I.'s, have decided to combine marriage with a college career, and thus have forced administrators to give attention to this married student situation.

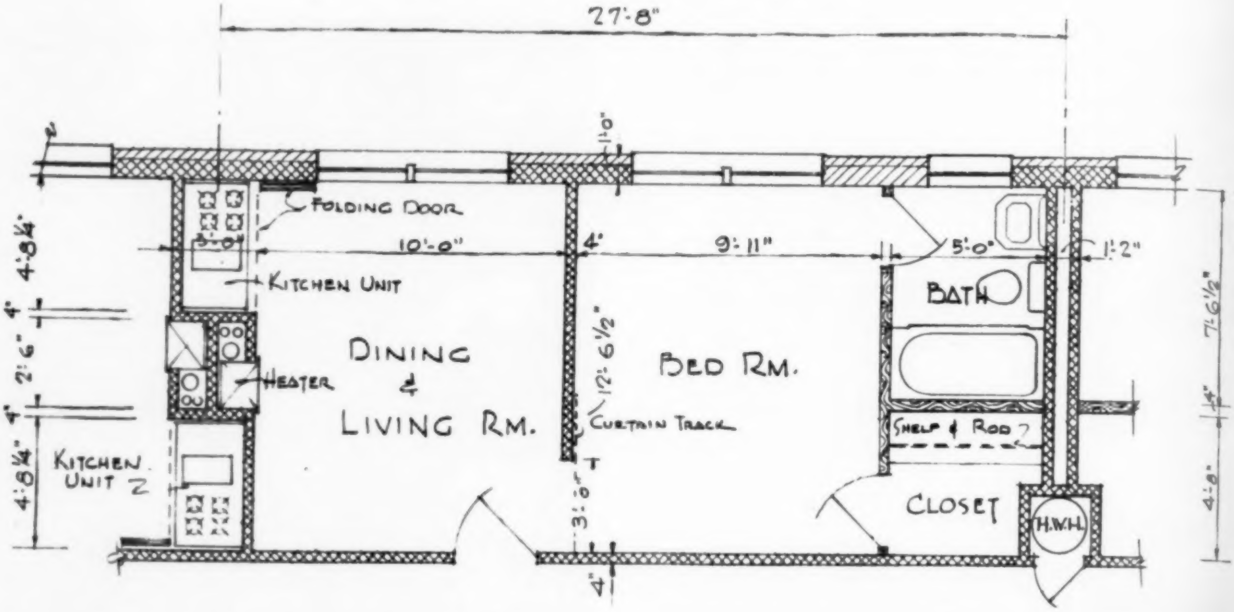
Henderson's first attempt to solve this housing problem was with the purchase of fifty prefabricated house trailers. This proved very successful until, finally, the time came when these trailers had to be replaced. Realizing that married couples were on the campus to stay, the college authorities started planning for a modern building that would take care of their needs and provide comforts comparable to the dormitory system.

A picturesque ridge in a new section of the campus forms a beautiful setting for the apartment building. To the north it overlooks a ravine densely shaded with oak, pine and dogwood trees. On a spur of this ridge, to the west, are ten new faculty houses that have been completed this year.

The large, red brick apartment structure faces the south toward part of the residence hall section of the campus. It is accessible to Highway 67 on the east, and joins Huddleston Street by an asphalt drive that paves the entire front and also provides ample parking space.

Designers of the Building

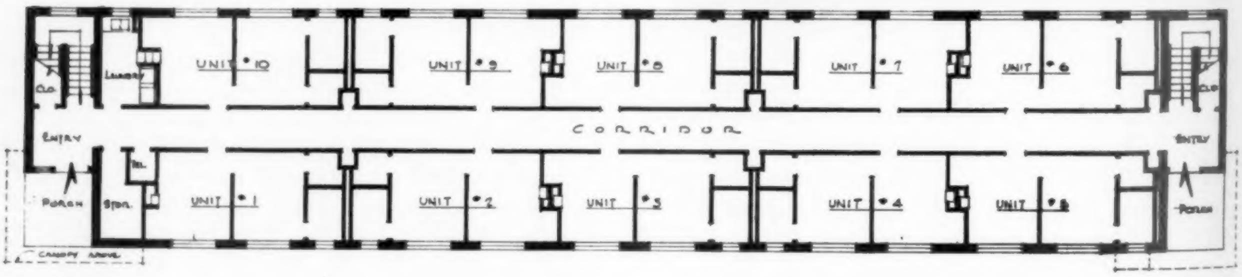
The firm of architects—Wittenburg, Deloney and Davidson of Little Rock, Arkansas, which had previously designed a number of buildings on the campus—



The typical layout of a student apartment includes a combination dining and living room. The kitchen unit is separated from this room by means of a folding door. The bedroom has a large closet and opens into the bathroom.

The chest of drawers in the bedroom is of metal and matches the other furniture in the room. All the furnishings for the building were purchased from a local Arkadelphia firm.

The first floor plan, below, includes ten apartment units, the laundry, two entries and porches, a storage room, two closets and a telephone booth.



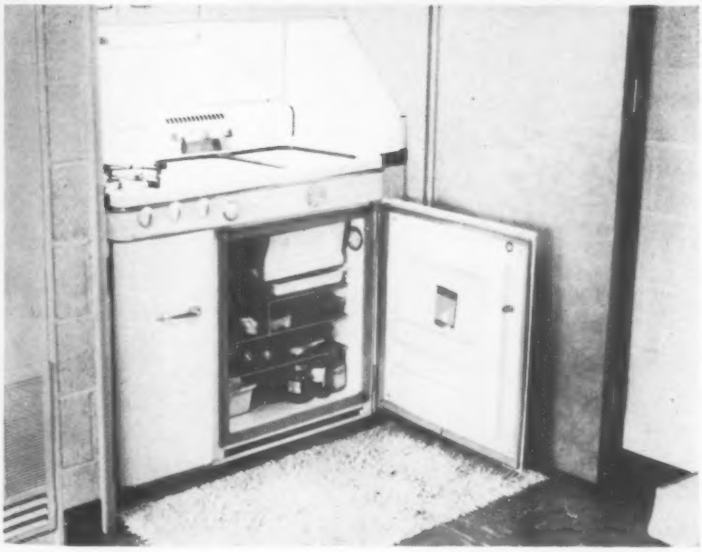
was employed to submit drawings for the new building. The plan selected represents a very closely coordinated unit, designed with maximum efficiency for the occupant.

There are a total of thirty furnished units in the building, ten on each floor. The construction is three stories of masonry, concrete floors on bar joists and a steel roof deck with an overhang. Steel sun shades, that also serve for ornamental purposes, run the length of the building, both front and back, at the second and third floor levels. These shades were additions to the original plan and were provided at a cost of $8,911.

Interior Details

The interior finish is of painted haydite block walls, plaster ceilings, asphalt tile floors on the first floor and rubber tile (for noise reduction) on the upper floors. All baths have ceramic tile floors and walls. Interior doors are of birch slab and exterior windows are steel double-hung. The material used is durable and will require

The metal furniture used in the apartment building is modern in appearance, servicable and easy to care for. Touches of genuine brass are used to accentuate the beauty of the finish.



The combination kitchen unit includes an insulated oven, which is large enough for roasting a turkey, a three-burner cooking surface, a double basin sink and a compact refrigerator. A large aluminum tray fits over the sink and provides added working space.

very little maintenance and upkeep. The ceiling of the corridor on the first floor is covered with sections of perforated corrugated aluminum. This interesting material reduces noise and gives convenient access to pipes and fixtures in the ceiling.

The units are heated by individual gas-fired heaters in each apartment. These are thermostatically controlled and completely safeguarded against failure. Hot water is furnished every two apartments by tanks placed between the apartments and accessible from the corridor. Each unit consists of a living, dining and cooking room, a bedroom, bath and large storage closet. The cooking arrangement is in a small alcove off the living-dining area and is a single unit that includes a stove, sink, refrigerator and storage cabinets. This entire section is concealed behind folding doors.

Modern Furniture Provided

The living area was designed to permit the use of small modular furniture for living, dining and study.

The red brick apartment house has thirty furnished units. It is three stories high. All units within the building are heated by individual gas-fired heaters in each apartment.

The table is smartly styled and easily seats six people. The top is made of a platinum walnut woodgrain plastic, and the double tube legs with satin brass trim add a modern motif. The chairs, of similar design, are covered with spun saran in attractive colors to match the settee and an armless chair. The material used for covers was selected because it cleans easily and is beautiful and durable. The bedroom accommodates a large chest and either double or twin beds. The colored metal furniture fits into the color scheme of each unit.

Service Facilities

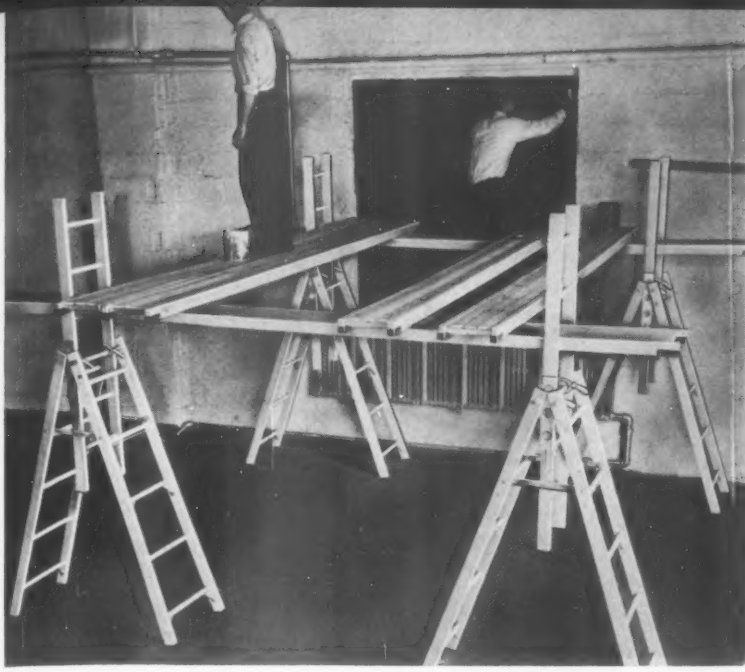
All rooms have exposure on the outside walls, and the large double windows in each room create a spacious effect that is very desirable. Each floor is provided with a laundry room, storage room and telephone booth. The laundry rooms have fifty-gallon hot water heaters, automatic washing machines and two large permanent wash basins.

The apartment for the hostess in the building is located on the first floor and is convenient to the east entrance.

The Facilities Please All

The Henderson State Teachers College apartment building for married students has been in use for two months and at present there is only one vacancy. All who live there seem pleased with the facilities and many married couples anticipate happy years of college living.

The bedroom accommodates a large chest and double or twin beds.



It is important that the custodial personnel for school buildings be selected according to the requirements of the jobs and also according to desired personal characteristics.

GOOD MAINTENANCE PRACTICES: A SYMPOSIUM

EFFICIENT PLANT OPERATION AND MAINTENANCE

by DEXTER M. JEFFORDS

Assistant Superintendent in Charge of Business Affairs, Oak Ridge Public Schools, Oak Ridge, Tennessee

WHEN considering efficient school plant operation and maintenance one must set a framework within which the measures of efficiency may operate. Are unrestrained economy, ease of performance, shortness of the time element, showiness, etc. to be the criteria, individually or collectively, without consideration of the purposes of our public educational institutions? No, it is better to think of plant operation as one important cog in a wheel designed to implement an accepted philosophy of education for a particular community.

In simplified form a part of this philosophy would indicate that youngsters involved in the learning process are affected by their environment, a factor over which a youngster has little control or choice, since we require that he attend our schools, well kept or unkept, for twelve years. Thus, it becomes our responsibility to insure that we do not negatively influence the success of an educational program with poorly lighted, cold and inadequately ventilated, unclean and untidy classrooms; or upset a balanced fiscal plan with inefficient techniques.

To achieve efficient plant operation within the framework outlined there are a number of considerations demanding attention. Among these are personnel selection, orientation of employees, organizational arrangements, equipment requirements, public relations and some general problems.

Personnel Selection

School administrators make all kinds of efforts to obtain the best trained teachers for our children. Why not expend the same effort to obtain the best for those who housekeep in the educational facilities? How can we get the best?

An interview should be held with each prospective employee to ascertain the person's fitness in terms of the characteristics desired in custodial personnel. Age is an important consideration. The starting age should be about twenty-one and it should not exceed forty-five years for beginners. The reasons for this are maturity, an essential in public schools, and the fact that it requires at least five years to really train an efficient custodian.

The applicant should be morally fit for the job. Do his personal habits conflict with what parents are

willing to accept in terms of his associations with children? He should be patient, tactful and exhibit a willingness to work. It may be that people who are not high school graduates should no longer be accepted. Since versatile men and not men with one track minds are wanted, avocations are worthy of consideration during the interview. Honesty, personal appearance, dependability are also desirable characteristics.

Physical fitness should be required of all prospective employees and should be determined through physical examinations. Some school systems require a health certificate from employees each year. The person hired should be free from chronic or communicable diseases. Absenteeism will be reduced if the physical fitness of a person is realized before employment.

In short, the old "chewing tobacco" philosophy that anyone can perform the custodian's job is no longer an efficient idea. Selection based upon a physical examination and real personnel work provides a basis for placement of the right man in the right position with knowledge as to why he is there. All persons employed should be considered on probation for a three-month period. During that time, with the proper supervision and training, an adequate check can be made for mistakes in the original selection process.

Orientation of the New Employee

The orientation of a new custodian is important. The new employee should understand the work expected of him and know his colleagues—the principal, teachers, students, his fellow workers. Since the beginner may need considerable help in the many tasks requiring different techniques, a tour of the building with the head custodian explaining the work schedule and introducing him to others can be followed up with a "buddy" plan for a day or so. In addition, a written work schedule, outlining what the custodian is expected to do throughout his work period with time allotments for each job, is of great value.

Some plan of continuous in-service training for all custodians is a "must" for efficient plant operation. The objectives of such a program are to gain a better understanding and working knowledge of the many required skills, to know why the work must be done and to share the best accepted methods. A two or three hour meeting of custodians each month can be an excellent means of instruction while a five-day refresher course covering such subjects as pupil safety, fire prevention, psychology and including demonstrations may prove very profitable. Do not miss an opportunity to utilize your own men in these sessions. The employees will feel that their training is really practical when the instructor knows the equipment and local working conditions. Periodic bulletins, posters, films, planned visits to other school systems, short courses at colleges and a positive kind of supervision are also measures of on-the-job improvement.

For beginners as well as older employees the development of a custodial library is worth while and can be achieved with small expenditures of money. Each custodian should also have in his possession a custodial manual and an appropriate handbook. Provisions of this kind will pay off in efficiency through encouragement of interest and skill on the part of each employee.

Organizational Arrangements

In any organization it is important to establish reasonable lines of authority and responsibility and to have these clearly understood. Usually the supervisor is responsible to the assistant superintendent in charge of business affairs, with head custodians in each building, shift foremen where needed, and the necessary custodians and maids. The relationship of principal and supervisor is no problem when recognition is given to technical competence and teamwork. Any situation lacking teamwork has little chance for success. In this regard it should be remembered that the interest and enthusiasm for their work on the part of a well selected and trained custodial staff carries over to others in the school system.

The personal treatment of custodians is important to an efficient program of plant operation. The place for the impatient, arrogant, bossy supervisor is gone. In his stead should be a leader who inspires respect

Plaza Photographers

Continuous in-service training programs for school custodians will benefit the whole school system as well as the personnel involved.

and confidence through patience, firmness, fairness and competence. Knowing your custodians' home lives, their interests, hobbies, backgrounds and just being human with them pays dividends. Even the title attached to employees has significance in this respect. Generally, titles like custodian or building service employee are more acceptable than janitor or sweeper, and they go a long way toward developing good will.

Other Factors to Consider

Even with the right kind of leadership and personal treatment there are other factors of working conditions which should be given consideration. Salary, vacations, sick leave, hours of work are a few such factors. Having salaries which are based on employment of the cheapest possible labor does not generally result in efficiency. Hourly and annual rates of pay for like types of workers in a particular locality should be studied before establishment of a schedule for custodial personnel. This means that the decisions of both salary and hours of work are based on what is fair for school employees in relation to similar work in the community, and not on union demands alone.

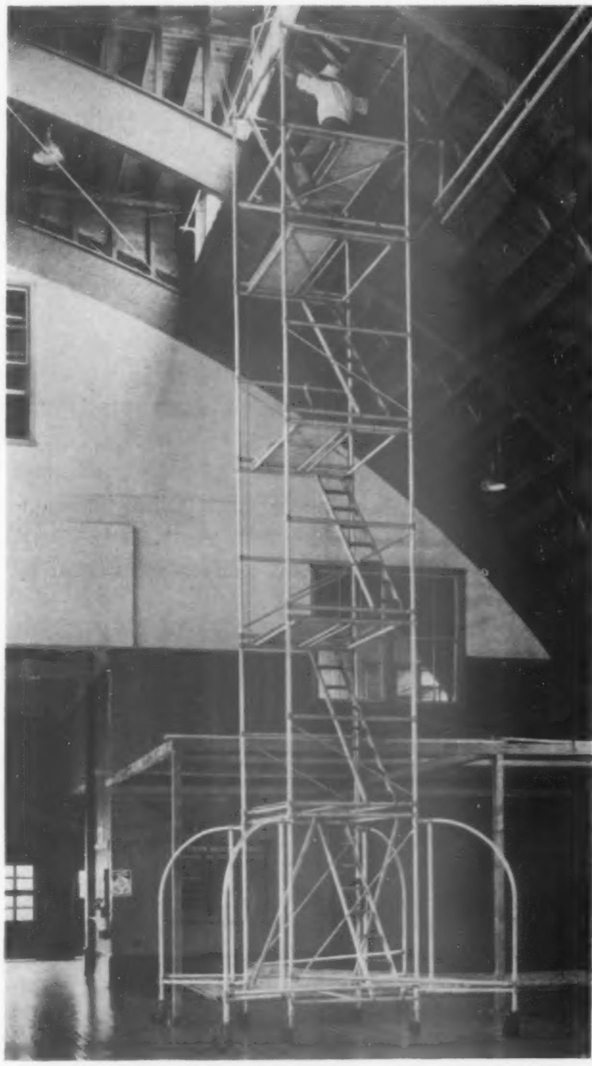
Vacations and sick leaves are measures of good will and should be granted. The amounts of each can be determined in much the same manner as suggested for setting rates of pay and hours of work.

It has already been stated that a written work schedule is an effective device for orienting new custodians. In addition, an efficient custodian can effect financial economies in carrying out his duties by reducing wasted time through proper scheduling of work assignments. No single schedule will work for all men or all buildings and the first schedule written should not be considered final. Although a schedule is agreed upon and written, after consultation with the principal and teachers, it cannot be expected to operate like clockwork. The important thing is that there be written schedules and sufficient manpower to do the job at hand.

By proper recognition of custodial employees the place of plant operation as an integral part of the total educational program is determined and this will guarantee provision for it in the fiscal plan. An efficiently organized program of building services will probably amount to approximately 10 percent of a reasonably sized school system's budget.

Equipment Required

Since labor accounts for a large proportion of the cost of plant operation, the provision of appropriate custodial tools, supplies and equipment means a saving in time and increased efficiency. Electric scrubbing and polishing machines, vacuum cleaners, power mowers, portable scaffolds, mechanical devices for washing walls and Venetian blinds and the best of hand tools



Chicago Architectural Photographing Company

A savings in time and increased efficiency will result when school custodians are provided with the necessary equipment for a job.

for sweeping, dusting, etc. represent real economies. Tool kits of small mechanical tools will pay for themselves because minor maintenance type work will be performed by the custodian.

Without an adequate supply of housecleaning materials, such as cleaning detergents, floor seals, waxes, etc., available manpower can be wasted. Widespread assistance in the preparation of specifications for these materials will assist in insuring that effectiveness is a realistic basis for selection. The decision should not rest solely with the purchasing agent. It would be false economy and inefficiency not to plan for periodic maintenance and/or replacement of equipment.

The question of uniforms for custodial personnel is one of long standing. It seems preferable to have them wear uniforms. The improvement in personal appearance and the personal pride in such a uniform should result in better work by the employee and a greater respect for such work by all concerned.

One aspect of the custodian's job is that he must

please pupils, teachers and principals. Without police power, much must be done by persuasion, and tact and firmness are needed. The custodian should know whom to call or refer a situation to when outside groups are overly insistent with requests which must be denied.

Each custodial employee should recognize that he may be the only contact some of the public may have with the school. It is on the basis of this contact that schools in the community may be judged. Gossip and criticism create a poor impression.

Continuing High Standards

Other items related to efficient plant operation are careful planning and construction of new buildings to assure future cleanliness and ease of attaining it, and adequate provision for the use of buildings by community groups. This should include rental rates so that the regular school program is not adversely affected by expenses incurred for other uses of school buildings.

More responsibility should be assumed for dictating the kinds of equipment to be used. We have inventors on our staffs. Let's get manufacturers to work for us in meeting our needs rather than have to fit our work to their equipment.

In summary, the continuation of high standards of building service in an efficient manner requires that considerable attention be given to (1) recognizing the essential place of plant operation in an educational program; (2) securing people with desirable characteristics to fill custodial positions; (3) planning continuous programs for training of potentially capable employees; (4) providing the right kind of organization and relationships including adequate working conditions, good salaries, written work schedules and sufficient manpower; and (5) providing appropriate tools, supplies and equipment in adequate amounts.

TRAINING AND SUPERVISION OF CUSTODIANS

by E. H. MOLDENHAUER

Director of Maintenance, Fulton County Board of Education, Atlanta, Georgia

THE learning processes of children are affected by their environment and that fact, in itself, is sufficient justification to emphasize the importance of good school plant operations. The increased technical nature of operating our school plants and the failure of many teachers, principals and administrators to realize their position in the proper utilization of school plant operations further emphasize the fact that a good continuous program of training and supervising custodial services is a must to a school system.

What factors contribute to a good program of training and supervising custodial services? It would be wonderful to be able to answer the question objectively, but observations and experiences lead one to conclude that good systems of custodial services must be designed for the school systems in which they are to operate. Geographic problems, labor relations, board of education policies and public relations are just a few variables that influence any method of training and supervision.

One of the most important contributing factors to a successful training and supervisory program is the delegating and accepting of responsibilities for the program. In our Fulton County system this is vested in the director of maintenance. When this responsibility of training and supervision has been properly delegated and accepted, the program may begin.

The custodian is an important part of the school system and the efficient operation of the school building depends on his own personal fitness.

The Fulton County School System's program of

training and supervising operational personnel consists of three separate phases. First, there is training at the specific school location with the individuals assigned to the school, which includes the pupils, teachers and principal; second, two schools are designated for in-service training for new employees as well as existing employees; third, there are general and special operating personnel meetings held regularly at convenient locations for the purpose of discussing problems of a general and overall nature.

Our first phase of training and supervision is probably the most important inasmuch as the dealings are with individuals. Here is where we gain the confidence of the individual and convey to him the fact that we are working for the best interests of child and school. We must also convey the idea that a chain is only as strong as its various links and, as supervisors or directors, we must gain the complete confidence of our personnel. We must develop their ability to utilize tools and materials and, most important, we must encourage those personalities, habits and traits which will result in an efficient operations and custodial program. Let us look at a few pertinent points to remember:

1. Never allow your situation to get to the point of lax human relationships. A continuous diet of understanding pays off. Study your people and approach the work problem according to the individual. Some people are simple, some are complex. Get to their level of thinking.

2. In your capacity of liaison person, present to people the problems of the school system and show how custodial services are an integral part of the overall

Student participation in classroom responsibilities encourages better citizenship and care of the physical equipment in a school building.

Young-Fulton County, Atlanta, Ga., Schools

In-service training, with operating personnel, means the proper utilization of the latest technical and material changes in the plant.

system. Inform them of purchasing, delivery, departmental and instructional procedure. It will pay dividends in better understanding.

3. Tools and materials are changing rapidly. Here again, some people are very responsive to recommended changes, while others operate under the philosophy that "you can't teach an old dog new tricks." This is another problem that must have the proper approach for best results. For example, it has taken our system about three years to provide and use properly new machines for scrubbing and synthetic detergents in all schools.

From these few situations we can see the magnitude and importance of this first phase of training, one that requires a continuous effort.

Two Training Centers

To cope with the problems in the second phase of our Fulton County program, we have set up two centers of training. Because of the geographic peculiarities of our school system, one center is located in the southern portion of the system and one in the northern part. These centers were established where there are work experiences for almost every situation, where accessibility is a factor and where a head custodian is placed who can assist in the training. Here a vast majority of new personnel are sent to gain experience before being assigned to a permanent location. At these centers new tools and materials are brought to be tested and performance data is accumulated to assist the purchasing department.

Sometimes existing personnel have a tendency to become complacent and not too responsive. The training centers are an excellent place to which these people can be transferred to obtain refresher training and a stimulated outlook. The centers also mean that there is on hand a pool of experienced labor should unan-

ticipated emergencies or absences occur. These centers have assisted immeasurably in reducing our labor turnover. With other contributing factors, we insist on 20 percent as our maximum allowable labor turnover with 15 percent as our projected goal.

In the third phase of the training program, our people are brought together at regular general and area meetings. Sometimes it is necessary to supplement the meetings with additional special ones. At these meetings problems affecting the entire personnel or only special divisions are discussed and evaluated. For example, several years ago, through these meetings, we prepared our group for the time when they would be paid monthly like all other school personnel. With this orientation, the change was made without difficulty.

Visual aids with manufacturers' demonstrations are incorporated into the group meetings. We have also set up panel discussions with students, teachers, principals and supervisors. In this way common problems are interrelated with common understanding. We continually keep our operating personnel informed concerning employee benefits and feel very strongly that good working conditions and a feeling of confidence and security pay great dividends.

Student Participation

Student participation is also a most important phase of this program. Our efforts here are usually channeled through the student councils or similar organizations at the schools. I recently asked the president of one of our student councils to tell me how her school was participating in the program. This is what she said: "Every student at Hapeville High School enjoys working with the custodial staff. We realize that these people are a real part of our school and each year a special program is given saluting our custodian."

It is important to be ever aware of the need to evaluate the custodial training program and continually to measure its accomplishments in terms of the job that is done.

REDUCING PLAYGROUND ACCIDENTS

by DELMAR D. OWENS

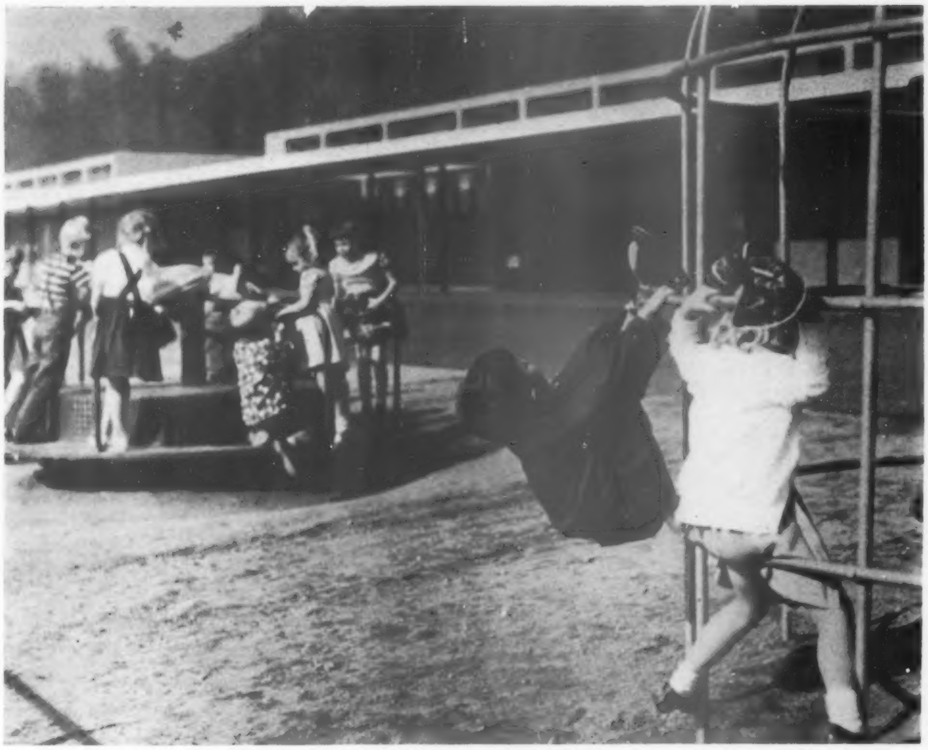
Superintendent of Buildings and Grounds, Durham City Schools, Durham, North Carolina

THROUGH the years, the number and types of games being played on school playgrounds have increased. Play areas have become cluttered with the many kinds of apparatus needed for these games. In junior and senior high schools playgrounds often double as athletic fields too, thus increasing the amount of equipment provided.

The number of accidents on playgrounds involving collision with fixed objects has increased rapidly as more types of apparatus are erected or placed on the grounds. Protective nets, padding and similar devices have been tried; but with children, dogs and weather these do not last long.

Whenever a collision accident occurs, the student involved invariably says, "I didn't see it." This seems like a rather silly reason when the object collided with is as large as a football goal or a blocking sled. Upon closer examination, however, the statement is not so ridiculous as it sounds. Most accidents occur when the student is playing a game other than the one involving that particular piece of equipment. The child's attention is therefore focused away from the object; and, unless there is something outstanding about the appearance of the object, it will tend to merge into the background. This is particularly true when the object is to one side of the line of vision.

Every possible measure should be taken to prevent accidents which are apt to occur when children are playing on the school grounds.



The equipment provided on a school playground is designed for play activities, but accidents do occur unless preventive steps are taken.

One day, after installing a new set of football goal posts on a practice field, our men gave them a prime coat of lead paint in preparation for the usual coat of aluminum. Circumstances delayed the application of the aluminum paint for several days, leaving the posts a very bright orange in color. It was noticed that the goals were clearly visible against any type of background. When some of the football players remarked that they hoped we would leave them that color because it made the posts easier to avoid in practice, we decided to experiment. We found an enamel paint that was an exact match for this color; and we enameled the posts, blocking sleds and other equipment in use on the playground.

Since then we have even painted the protective posts along driveways and walks this color. Where it is desirable we have painted all but a few inches at the tops of these posts a dark green, leaving four or five inches of the orange showing at the top.

Accidents Are Reduced

The number of accidents caused by students colliding with such objects has decreased tremendously since we started this program. We have been doing this for the past two years on all our playgrounds. We feel that this orange color makes all obstacles recognizable as such at even the most fleeting glance and permits the student to avoid contact and injury.

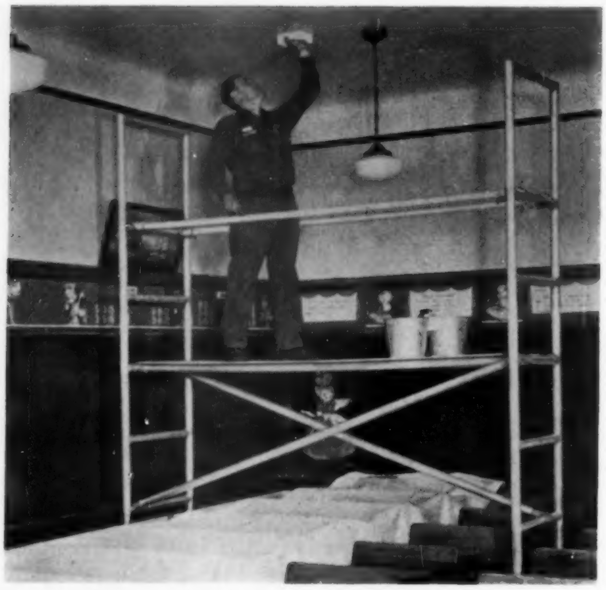
A TRAINING PROGRAM FOR CUSTODIANS

by RAYMOND SELBY

Business Manager, Board of Education, New Brunswick, New Jersey

We can no longer regard school building custodial employees as "janitors." In our New Brunswick school system the title of "building employee" has been accepted wholeheartedly by everyone in the organization. The morale of the staff in the operational field has thus been greatly improved, and more applicants apply for open positions. High standards have been set for this work and an improved salary guide is attracting a better type of personnel.

With mechanical equipment for the operation of schools becoming more complicated, with much of it automatic, there are great hazards to be risked by hav-



Custodial personnel should have a competency for whatever tasks are required of them in the performance of their daily work in school buildings.

ing incompetent employees. Only high school graduates or the equivalent should be considered for custodial positions in the schools. The age limit for new employees should be restricted to a maximum of thirty-five years.

All personnel should have the ability to work with their hands. A so-called handy man is one having mechanical inclinations and the ability to get things done in a workmanlike manner. The school plant employee should be able-bodied, of good character and able to pass physical requirements for the local police or fire department.

High Character Is Sought

Character of the highest esteem must be sought, for the greater part of a building employee's time is spent in association with children of all types and ages. Proper screening prior to hiring an applicant is necessary to make certain he has the right qualifications. A probationary period with in-service training will further test his ability to carry out the various tasks required of the position.

Assuming that the applicant shows promise for employment, the local police department should be called to fingerprint and clear him, both on the local level and also with the F.B.I. files in Washington. A report of this examination should be made in writing by the police department prior to employment.

Medical examinations should be conducted by the school doctor and a certification form received from him with a physical recommendation. A series of intelligence tests will help to evaluate the general intelligence and judgment of the prospective employee.

Tests of manual ability should be made to determine whether or not the prospective employee is sufficiently able to work well with his hands. Further intelligence tests in a practical field will assure the employer that the man has the capacity to qualify for the position after the in-service training program has been completed.

The New Brunswick Work Plan

It is necessary for employees to know where they stand, where they are going and what to expect of the administration. In this matter, it is well to have a breakdown of titles for each level of custodial employment. In the New Brunswick Public Schools we have the following:

Substitute building employee—serving probationary period
Assistant building employee—new appointment
Assistant building employees
Elementary building employees
Secondary building employees
Head building employees

The responsibility for the condition of the building rests with the building employee in charge of the building. All other employees in the building are his assistants.

For incentive purposes and organizational morale, the new employee starts at the bottom of the salary guide and advances step by step through the various positions as his own ability and incentive permit. The substitute or probationary period lasts a minimum of nine months and a maximum of eighteen months. During this period, certain requirements must be met. For example, all male employees must take the New Jersey examination for a fireman's license and receive it before they may be considered for an appointment.

The Rating Sheets

During employment the custodian has a rating sheet which is filled out by the principal of the school, the head building employee and the building employee in charge of the building where the man has been working. A similar sheet is given to the employee, himself, so that he may make a self-analysis.

The rating sheets are then compared and the new employee is told how well his self-rating compares with that of the others. He is also informed of his present standing and his future employment possibilities. The new man may be advised to seek employment elsewhere, or he may be encouraged or congratulated and told to keep up the good work.

A Preparation Period

The entire training program is to prepare men for positions as building employees. A new man is assigned from building to building every three months during

his probationary period. He is moved into and out of the various department or working units, including the maintenance department. Prior to his assignments, he is briefed on the strong points of the building employee he is assigned to and told what he is expected to know after he leaves each building.

Only a building employee is assigned to any one building. All substitutes or assistants are rotated from building to building in various working units.

A Good Appearance

The good appearance of school operational personnel is important to the school system. The ideal condition would be for the board of education to supply uniforms for the operating and maintenance employees and have these uniforms laundered often. Otherwise, it is best to have the men wear the same type of clothing.

In all organizations, the planning and goal of the administration should be to consolidate various jobs into a routine procedure. At the closing of schools in June in New Brunswick, we hold a building employees' training program school. We meet in various school buildings for one week and have demonstrations and discussions every day. The training school session opens with an orientation program which briefs employees on the purpose of the training school, the strong points of our organization and its weak points, and why various demonstrations and phases are being covered.

Why a Training School?

Why a training school? Well, 30 percent of the cost of any new school that is being built is for the mechanical plant. With so great an investment in the operational aspects of a school plant, time and training should be given to the employees who are expected to keep the building and equipment in peak condition.

After the probationary period, it takes us from four to five years to complete the training of a good building employee. Only after successful completion of this training is an employee assigned full charge of a building in the New Brunswick school system.

RESTORING AND MAINTAINING SCHOOL FURNITURE

by G. DEWEY SMITH

Assistant Superintendent in Charge of Buildings and Grounds, Kansas City, Missouri, Public Schools

MANY factors should be carefully considered in the selection and purchase of school furniture. Movable furniture has been replacing the fixed type so common a generation ago. More attention is being given to the shape, contour and adjustability of furniture as it relates to the physical development of children and fatigue causation. Durability is a prime consideration, especially for the buildings and grounds division which has the responsibility of maintaining the furniture after it is purchased and distributed to the school buildings.

Every school district should keep a continuous inventory of school furniture. These records provide information regarding the date of purchase, unit cost and vendor. Each unit of furniture should be stenciled with an identification which can be immediately checked with the inventory records.

Know the Replacement Cost

Knowledge of furniture replacement costs is important. Restoration and refinishing costs may prove to be excessive in relationship to the cost of replacement. The maintenance department must also be kept informed of the administration's plans regarding various types of furniture. In this way, extensive restoration and refinishing of furniture that is scheduled for replacement will not be undertaken.

There are various ways to consign units of furniture in need of repair to the maintenance department. Probably the most frequently used method is to have the principal sign a regular repair order. This requests the pick up and repair or refinish of a certain number and type of school furniture.

Regular Inspections

Regular inspections of all school plant facilities usually serve as the point of origin for much furniture repair work. Most school systems have a policy of annually replacing the furniture in a certain number of rooms. This replaced furniture is carefully checked. Those units considered worth the cost of repairing and refinishing are sent to the maintenance department.

The maintenance department of the Kansas City,

Missouri, Public School System restores and refinishes about 7,500 pieces of furniture a year at a cost of approximately $15,000. It is difficult to obtain cost patterns for restoration jobs because of the wide variation in the jobs—replacing metal legs, replacing wooden legs, replacing bolts and rivets or, frequently, the entire working surface.

A Cost Analysis

Since this school system is just beginning to use plastic coated working surfaces, the major types of refinishing are sanding, filling and varnishing. Shop foremen provided the following cost estimates for refinishing items. These costs include labor and material.

Item	Material	Labor	Total
Principal's desk (oak)	$ .81	$ 2.70	$ 3.50
Round library table (oak)	.40	1.35	1.75
Kindergarten table	.20	.95	1.15
Chair (15")	.25	2.00	2.25
Teacher's desk (oak)	.60	2.00	2.60

Removing old finish by sanding is estimated at 22 cents per square foot for labor and materials. The equipment used consists of small belt sanders, spinners, drum sanders and steel scrapers. Refinishing is done both in the shop and in the schools. After sanding, all school furniture has a filler and three coats of varnish.

OPERATIONS OF A FLOOR MAINTENANCE CREW

by BUVEN E. TUCKER

Director of Property Services, Tyler Public Schools, Tyler, Texas

THE problem of proper floor maintenance in school buildings has increased with the great variety of floor coverings now in use. Each school building presents an individual floor maintenance problem.

There are many factors that affect the wear and tear on the floors of a school—the number of students, the condition of the playground and the area surrounding the school property. A building that is located in an area where all streets are paved and where the play area is grass covered or hard surfaced does not have the problems of a building in an undeveloped section. Added to this are the different types of floor coverings in use which wear differently and which require different maintenance practices.

In the Tyler, Texas, Public Schools we have fifteen school buildings and an enrollment of 9,000 students. Approximately 35 percent of our school building floor area is covered with asphalt tile.

Deciding on a Floor Crew

Floor maintenance began to consume more and more time and we were faced with the problem of increasing our custodial force at each school or organizing a crew to care for all floors. We decided upon a floor crew and it has been operating for the past year.

The floor maintenance crew has three members who work from 3:30 p.m. until midnight. They are equipped with all the tools and facilities needed, and are transported from school to school in a panel delivery vehicle.

This floor crew maintains all asphalt tile floors continually. Floors in the gymnasiums and other wood floors are cared for during the school holiday periods. The foreman of the crew determines the maintenance procedure to be followed during each cleaning period. Some of the floors may be cleaned and buffed, while others are scrubbed, waxed and buffed. Nearly five weeks' time is required for the crew to attend to all the asphalt tile floors in the school system.

During the summer months the floor crew is augmented from the ranks of the regular custodians and numbers from ten to twelve men. All school buildings are serviced by this group. Walls and woodwork are cleaned, light fixtures and windows are washed, and all wood floors are cleaned, sealed and waxed. Our concrete floors are sealed with a regular concrete sealer.

Recording Product Use

In the past year we have experimented with various floor maintenance products. An accurate record is kept of the use of these products so that we may know whether or not they are meeting our specifications.

After a year of experiment, we feel that our floor maintenance crew has proved to be an economical procedure. Our floors are receiving better care than ever before and that means a longer life for them.

RESEARCH REPORT 8

PREDETERMINATION OF NATURAL ILLUMINATION BY THE MODEL TESTING METHOD

by WILLIAM M. PEÑA

THE challenge of new educational specifications has impelled architects toward the use of new and untried architectural forms with their resulting natural lighting problems. Most of the technical problems involved in new buildings, including mechanical, structural and electrical lighting problems, are being engineered accurately. Until recent years, architects who experimented with new natural lighting forms were forced to rely on intuition rather than on engineering. Consequently, the results were never substantiated until the buildings were completed. Even then, there was no method for comparison.

Engineered Natural Lighting

Now, natural lighting problems can be engineered with the use of models. Model testing methods make it possible for architects to predict the lighting performance of a building early in its planning stages. This means that our clients can be given "lighting" insurance and that their school buildings need not be guinea pigs.

It also means that, as architects, we have a method at our disposal to try many, many schemes to solve the lighting problems created by new educational specifications. A testing model can be built very easily and very economically; the cost of an experimental full scale school building is prohibitive.

Model testing is the only method we know about which lets us compare architectural forms—varying sky and landscaping conditions make it impossible to com-

THE PROBLEM:

Can the natural lighting performance of school buildings be predetermined before they are actually built? Or do we have to wait until buildings are completed before learning the outcome of our efforts to provide a good lighting environment? Can we take the guesswork out of new and untried natural lighting techniques?

Mears Photography

This report is based on pretests in model form and actual tests in full scale of this elementary classroom at Georgetown, Texas.

CAUDILL, ROWLETT, SCOTT AND ASSOCIATES
ARCHITECTS-ENGINEERS
BRYAN, TEXAS, OKLAHOMA CITY, OKLA.

For Research Reports 1, 2 and 3 consult *American School and University* 1954–55, Volume 26, pp. 433–448.

For Research Reports 4, 5, 6 and 7 consult *American School and University* 1955–56, Volume 27, pp. 409–436.

pare actual buildings accurately. To us this means a freedom of design we never had before. And the use of models has given us the courage to try forms that we never dared to use before—and to compare them for lighting efficiency.

This scientific approach to natural illumination engineering puts lighting in its proper place. Where, before, we had to subordinate education, structures, heating and aesthetics to lighting, we now can treat the natural illumination problem merely as one of the many problems involved in the design of a school plant. Now the dog wags the tail.

Roland Chatham

This is the artificial sky under which models are tested to predetermine the lighting performance of classrooms before they are built.

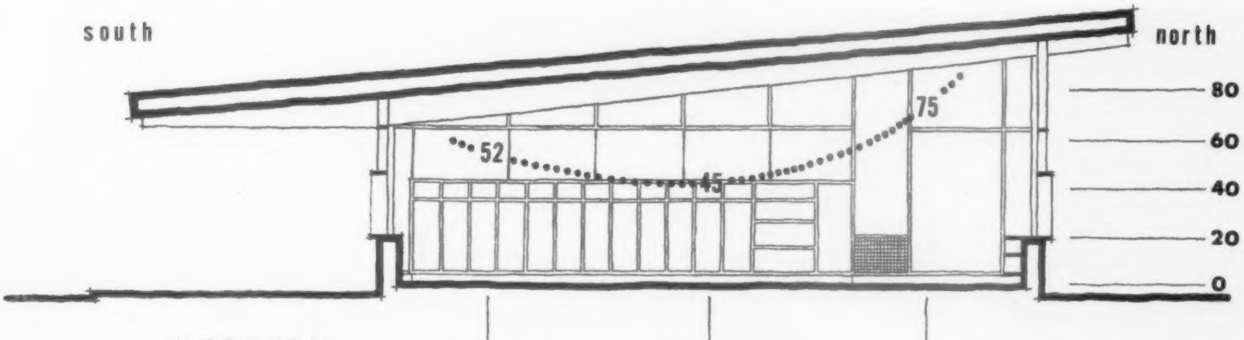
Here is one example of the use of models in predicting the natural lighting of a school building. In 1951, during the process of designing a school for Georgetown, Texas, we came up with a basic scheme having windows on two sides of the classroom and a sloping roof. The low projection of the roof formed the exterior covered corridor on the south and was designed to keep the sun from entering through the classroom windows. This low overhanging roof made us doubtful of the natural lighting potentials of the scheme and the inclusion of skylights was considered as a third source of light. It was then decided to have the scheme tested in model form at the Texas Engineering Experiment Station, College Station, Texas.

The Model Testing Process

A classroom model was built at a 3/4-inch scale, as nearly like the proposed building as possible. The model was then tested in the artificial sky dome with illumination valves based on a 1,000-foot-lambert uniformly bright overcast sky. Models are tested under these minimum light conditions since they represent the most critical conditions with which the actual building will be confronted.

Using light meters to read the intensities of light, two simultaneous readings were taken for each of nine locations inside the classroom model; one exterior reading on the vertical plane of the model's fenestration; and one interior reading at a scaled 30 inches above the floor level. The exterior reading always acts as a basis for comparing the series of interior readings.

Numerous alternates to the basic scheme were also tested, including the use of skylights, an opaque wall over the north windows, exterior fixed louvers and translucent glass in the window areas. The skylights were found to be unnecessary, which was a relief to us and to Georgetown's pocketbook. The results of tests on the alternates provided valuable information on the merits of their use. This information is beyond the scope of this report; however, it is important to note that the alternate use of the variations on



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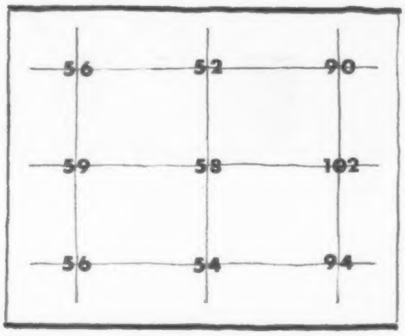
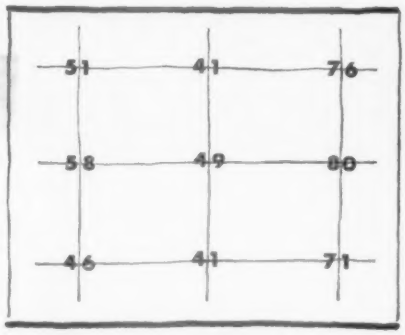


PLAN
MODEL



PLAN
FULL SIZE

The cross-section of the classroom tested is at top above. The intensity values, shown in foot-candles on the dotted distribution curve, are the average values for the full size building. A comparison of the above two plans will show that the predictions established by the model testing method are reasonably close to those of the completed building. The predicted intensities in foot-candles along the south windows are the most accurate, with an average difference of only 9 percent between the predicted and actual readings. The least accurate predictions occurred in the area near the north windows, with an average difference of 20 percent. Even though these predictions are considered satisfactory, more accurate results are now possible through the use of new and better techniques which have been developed since these tests were made.

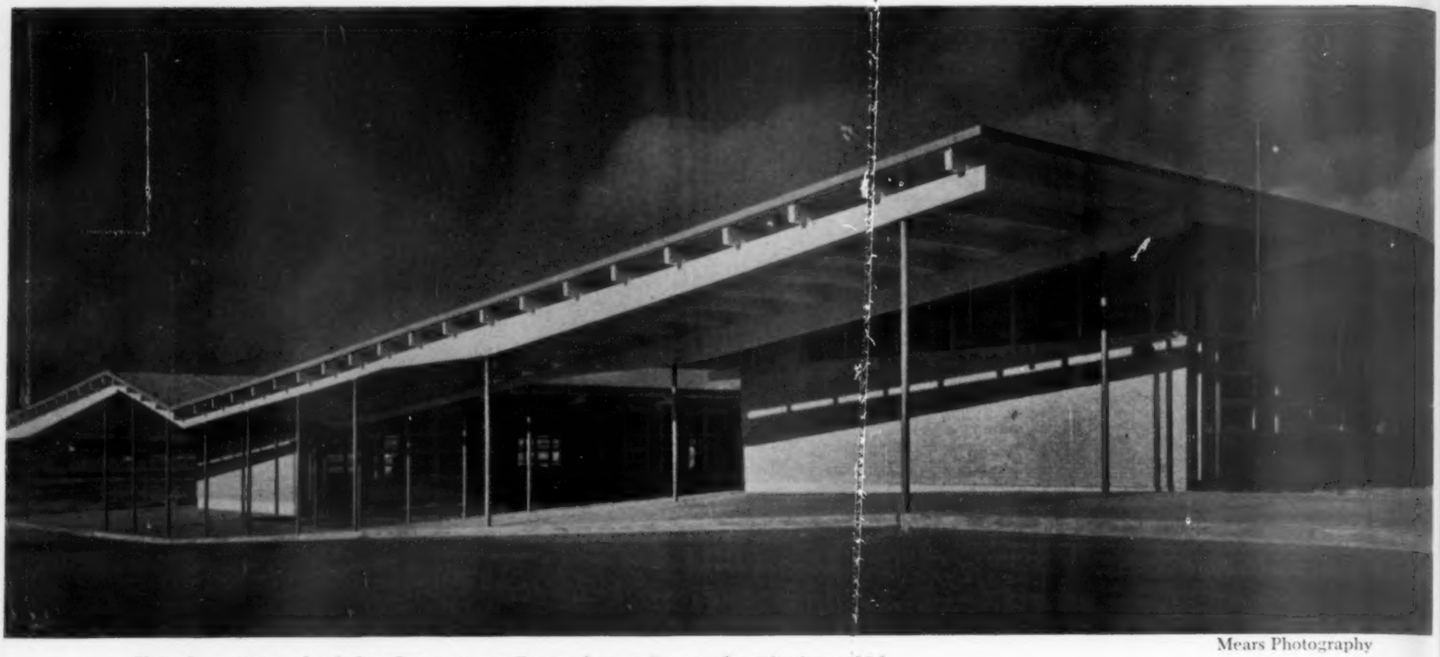
the basic scheme was easily and economically evaluated in model form before the final solution was completely jelled.

The results of model-testing the basic scheme predicted that the classrooms in the proposed building would provide intensify levels far above the recommended minimum of 25 foot-candles for proper seeing. The lighting would have a good distribution throughout the classroom and be within the recommended maximum diversity, but it would have more excessive than desirable brightness ratios between the most poorly lighted tasks and the sky.

The quality of the light could have been improved through the use of one of the alternate schemes, but that involved decisions not directly connected with this report. It must be remembered that the quantity (intensities) of light alone does not provide a good lighting environment. The quality of light involving brightness ratios and the distribution of light requiring an even diversity throughout the classroom are equally important in good natural illumination.

After the actual building was constructed and occupied, it was then tested in the same manner as for the model, but under a real overcast sky of non-uniform brightness. The comparative figures show that the model predictions were reasonably accurate, although the predicted intensities were somewhat high near the north windows. It was felt that this discrepancy was due to the non-uniform brightness of the real sky at the time the tests were made. Tests are now made under a more realistic artificial sky of non-uniform brightness to correct this type of inaccuracy.

The landscaping of the actual building was very much like that represented in the model tests. The landscape has a considerable effect on the natural lighting performance of a classroom. This has led to the development of a new testing technique in which exterior reference readings can be taken independent of the landscape. Using this technique the effects of design alternates in the landscape can be evaluated in the same manner as those in the building itself.



Mears Photography

The elementary school for Georgetown, Texas, has a low roof projection which forms the exterior covered corridor on the south. It is designed to keep the sun from entering the building. Tests on a model of the classroom proved that skylights, as a third source of light, were unnecessary.

CONCLUSION:

Model testing of proposed buildings for natural lighting *does* work. It is a quick and economical means of assuring good seeing environments in new schools and sometimes helps avoid costly mistakes. It also gives an architect more freedom in design by providing a measure of assurance to what he can and cannot do with natural light.

In using these model tests, the more details that are incorporated into the model, the more accurate the results will be. Although the essence of using model tests is to evaluate a scheme in its early stages, preliminary plans from which models are to be made should be carried as far as possible in terms of the dimensions, structure, materials and other factors involved.

Landscape Is Also Important

These important details do not stop at the walls of the building. The landscape can have just as much and sometimes more effect on natural lighting as the building itself. The landscape can be man-made just as the building is and, in terms of natural lighting, is an inseparable part of the design process and must be considered if accurate natural lighting predictions are to be made.

In model studies, quick and inexpensive changes can be made in any variable both in the building and in the landscape, inside or outside the building, to determine the effect such changes will have on the natural lighting inside the building. Such variables as the dimensions of a classroom, the color of the ceiling, walls and floor, size and location of windows, location of trees and shrubs, and the color and location of screens, streets, walks and terraces may all have a bearing on the final results.

Services Are Available

The Texas Engineering Experiment Station makes its model testing facilities available to the public in the form of a testing service. Architects, school officials, anyone with a natural lighting or natural ventilation problem can submit preliminary plans and have tests made. And the charges are very reasonable.

Yes, predetermination of natural lighting is possible and greater degrees of accuracy continue to grow out of continuous development and improvement of model testing methods and techniques.

References:

"**Accuracy of Daylight Predictions by Means of Models Under an Artificial Sky**" by Bob H. Reed and Matthew A. Nowak, *Illuminating Engineering*, July, 1955

"**The Study of Natural Illumination by Means of Models Under an Artificial Sky**" by **Edward E. Vezey** and Ben H. Evans, *Illuminating Engineering*, August, 1955

RESEARCH REPORT 9

by WILLIAM W. CAUDILL
THOMAS A. BULLOCK

BARRIERS AND BREAKTHROUGHS

THE PROBLEM:

What have we done to give our children better school buildings? What is yet to be done?

Every so often let us take stock of the school plant situation to see where we stand. This report is an evaluation of school architecture as we see it today.

THERE is no doubt about it—school architecture in the United States has come a long way during the last few years. In fact, many students of architecture believe that more progress has been made in the school field than in any other, including the commercial field which has given us beautiful and functional shopping centers, for example.

A close examination of what has been done in educational architecture shows tremendous progress at the elementary level. During these last five years some classics in elementary school architecture have been produced. And more excellent elementary schools are on the way.

The picture is not so bright at the high school level, but it is a very improved situation. The same planning approach, which produced our nation's good elementary schools, is gradually creeping up to the secondary level. Also, many creative architects are being assigned to do high schools because of their past performance with the smaller schools.

Another encouragement is that school boards are seeing to it that competent, creative educators are available to work with competent, creative architects in solving secondary school building problems. Good architects alone cannot produce excellent schools. Nor can good school administrators do the job alone.

An excellent school plant comes into being through the teamwork of good architects and good educators acting as co-captains of a well balanced architectural-educational team. And today we are getting that kind

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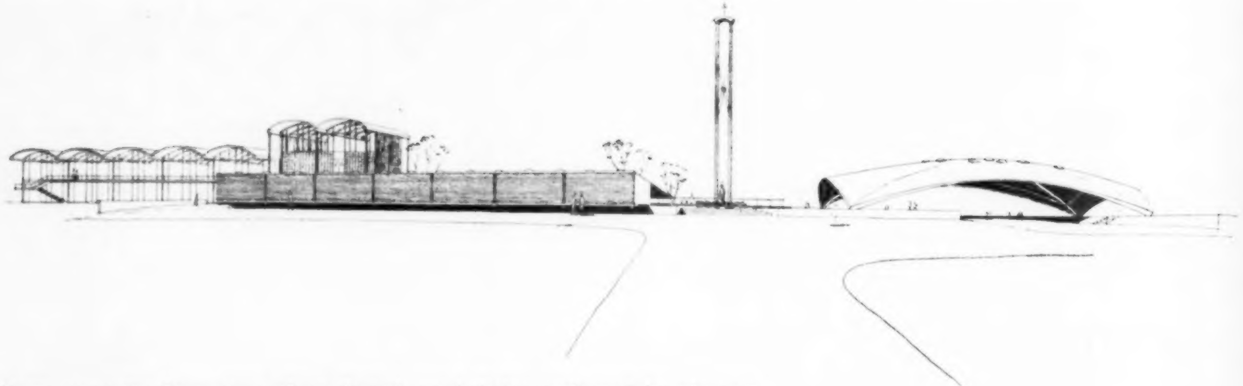


Many economies have come about through good design performed by planners who continually seek better answers. Shown here is St. Joseph Academy, Brownsville, Texas.

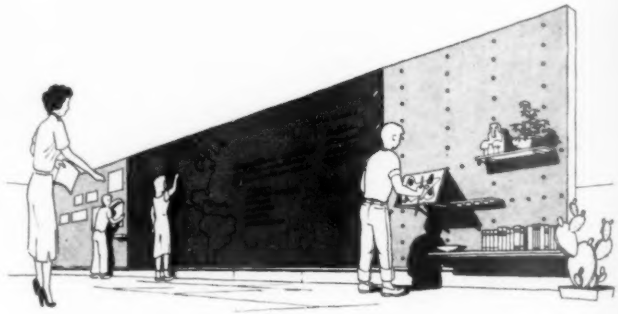
of cooperative planning setup on an encouraging number of proposed high schools.

School people and the architects alike have real reason to be proud of this progress. But there is much to be done—many barriers to break through—before we give our children better school plants.

Some Barriers

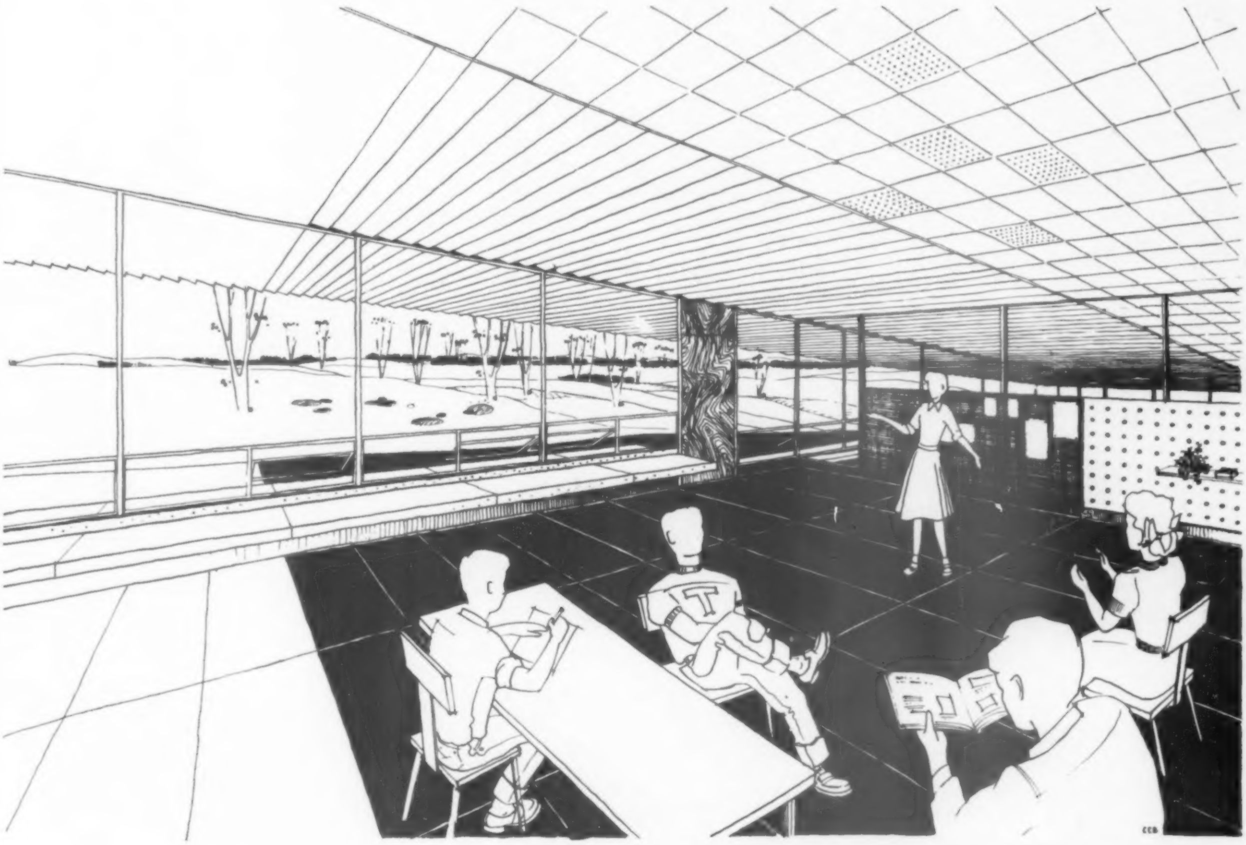
What are the obstacles to obtaining better schools? These seem to us to be some of the greatest barriers:

1. Architectural Prejudice: Preconceived ideas about what a school should look like, unwillingness to accept a new architecture and the inability to understand our dynamic society, which requires dynamic architecture, are the causes of the expensive sterility of school architecture today.
2. Educational Prejudice: The "what's good enough for me is good enough for junior" attitude of people responsible for the education of the community, together with the demands of these same people who insist that their school buildings be as obsolete as their educational programs, create great barriers to school building progress.
3. Obsolete Codes: Old codes, even some new ones, and misinterpretations of both often dictate excessive construction expenses. What architecture needs is stimulation, not dictation.
4. Sound Technology: The use of movable partitions, light wall panel construction, open planning techniques and higher sound level teaching activities make sound problems more difficult to solve.
5. Structural Techniques: Columns get in the way of a changing curriculum, and there is a need for economical structures enveloping large, uninterrupted areas.
6. Building Complexity: Too many trades step on each other's toes trying to put together too many parts. This makes the building process an expensive and complicated one.



The classroom wall is no longer a mere wall but is a vertical teaching surface—an educational tool. Such is the case in the Laredo Junior High School, Laredo, Texas, (above). Architecture, like that of the Moore Junior High School, Tyler, Texas, (below) can help children to grow and develop normally.

7. Small Building Units: Thousands of small pieces of material go into an ordinary school building, necessitating high labor cost to put them together. What the architects need are fewer and larger units with which to formulate economical, beautiful school building solutions. And we are not talking about prefabricated schools, or even prefab classrooms, but we are speaking of large prefab building units.
8. Inadequate Building Units: There is a great need for low cost, low maintenance units such as: (1) window units which fit tight enough to keep out the wind, rain, dust and snow, and which will ventilate properly; (2) a scuffproof flooring material; (3) a multi-use ceiling-deck which also



Research in lighting and ventilation of school buildings has led the way to the use of lower and more economical ceilings over better lighted and better ventilated spaces, as in the Moore Junior High School of Tyler, Texas.

can serve as a roof; (4) better flashing materials; (5) paintless walls; (6) simple and sturdy hardware; (7) less complex heating and plumbing systems and fixtures; (8) a good, low brightness lighting fixture for low ceilings; (9) cheaper and better materials which will alleviate the shortage of wood, brick, steel, concrete and copper; and (10) sympathetic trades to use these improved or new building materials.

9. Static Thinking: The use of stock plans and the static thinking behind them is one of the greatest barriers of all. The people who build these barriers must be brought to realize that good design pays off and actually costs less than poor design. The important economies of the day have come about through good design performed by competent planners who seek better answers—not stock answers. 1920 architectural solutions cannot be used for 1960 architectural problems.
10. Unit Cost Bugaboo: The need for an accurate and true yardstick for evaluating school construction cost is urgent, because a great number of school planners are still trying to compare their unit square foot cost as they do their golf scores. Yet, "lower the better" most certainly does not apply to schools, and even if it did the comparison would be worthless because unit cost does not consider such variables as soil conditions, climate, site shape, educational feasibility, quality of fabric, strength of structures and environmental controls.

Some Breakthroughs

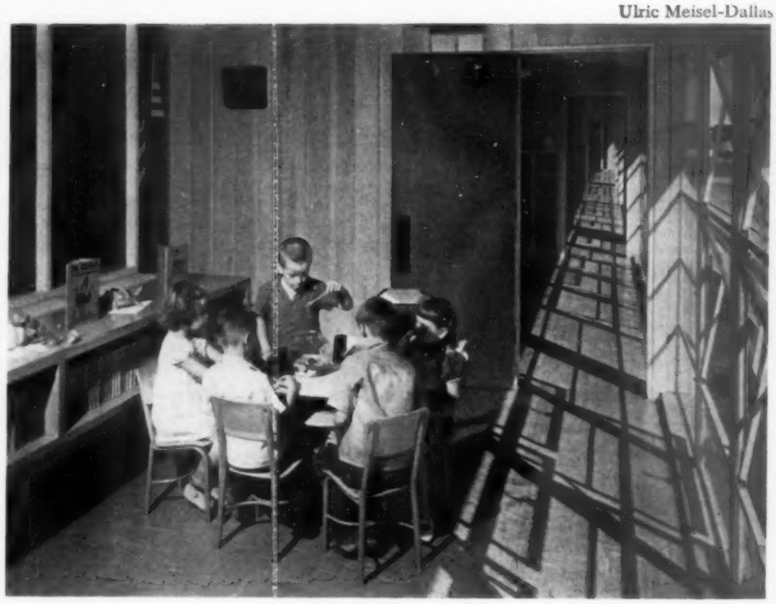
There are, of course, a great number of breakthroughs to offset the barriers. Some of the breakthroughs represent isolated cases with only a few architects and educators involved. Others represent general participation and acceptance. The important breakthroughs are:

1. Group Dynamics of Planning: At last the architects, the engineers, the educators and the patrons are beginning to learn that teamwork pays off in better school design. We hate to admit this, but architects alone cannot produce truly functional school plants.
2. Research Approach: A few, but influential, creative architects, working together with creative educators, have made substantial progress through a research attitude approach to solving school building problems. They are never satisfied with

Roland Chatham

Group dynamics played an important part in the planning and design of the new high school for College Station, Texas.

Ulric Meisel-Dallas



All kinds of plan types are at the disposal of school planners. The elementary school for Clinton, Oklahoma, is a far cry from the traditional double loaded corridor scheme once so common in school design.

just answers, but continually search for a *better* answer to problems of educational feasibility, lighting, sound, heating, ventilation and structures.

3. Plan Types: School planners are beginning to realize that in order to solve their problems they must have at their disposal all kinds of plan types —finger plans, quadruplexes, campus plans, back-to-back arrangements, single loaded corridors, double loaded corridors, combinations of the two, spoke-wheels or any other combination of geometric arrangement—and that the traditional, code-dictated double loaded corridor arrangement is just one of many.
4. Learning Walls: Thinking school planners no longer consider the classroom wall as a mere wall, but as a vertical teaching surface—an educational tool.
5. Outdoor Learning: The concept that learning is not limited to the classroom shell—that it does not stop at the door threshold or the window sill—is opening up new opportunities for effective and economical educational facilities.
6. Teaching Space Dividers: One of the major breakthroughs of recent years is the use of the teaching space dividers which are in essence pieces of educational furniture used to subdivide a large loft space into teaching stations—an economical and effective answer to the cry for flexible classroom wings.
7. Student Center: The slow but final recognition

Ulric Meisel-Dallas

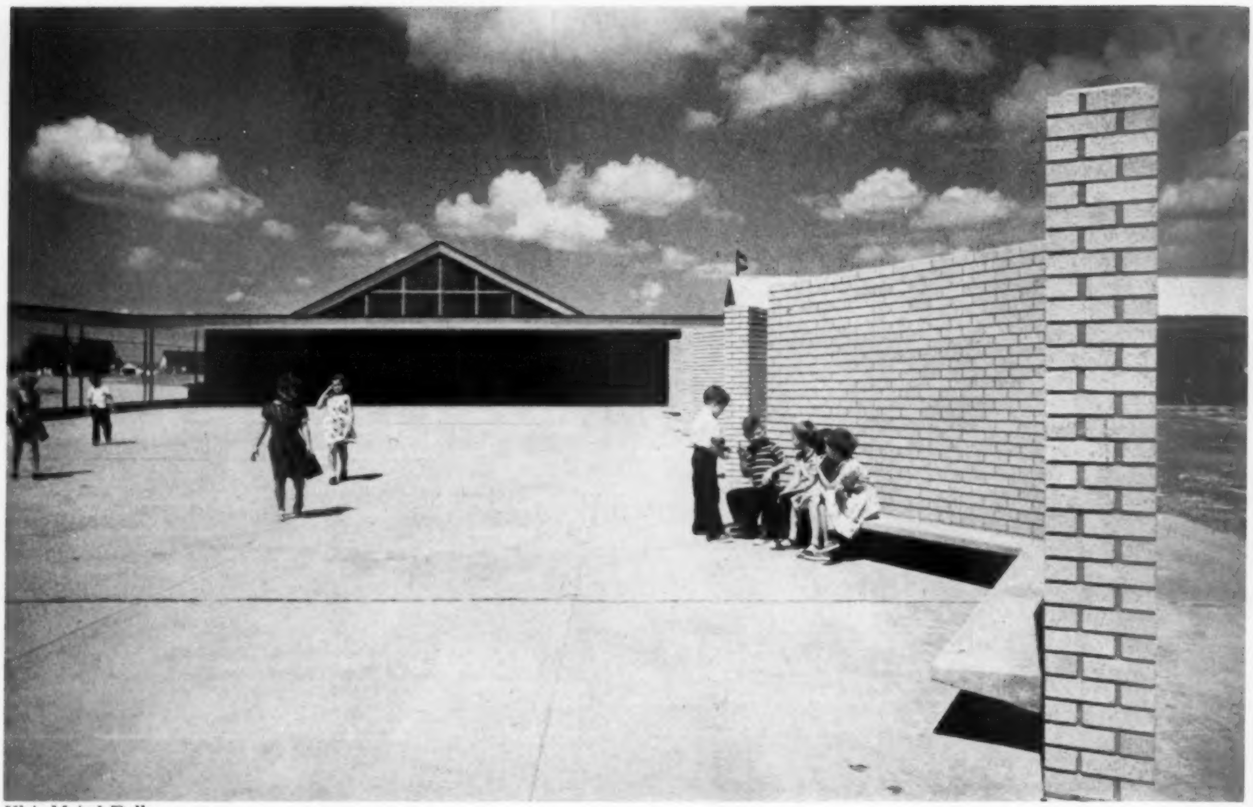
The low ceilings of the elementary school in Miami, Oklahoma, are the result of research which has proved that low, economical ceilings can be placed over spaces which are well lighted and ventilated.

Humanistic architecture has helped to create a colorful, warm and friendly atmosphere in the elementary school in Bartlesville, Oklahoma.

Hedrich-Blessing

that every school should be designed to be the nicest place in town for youth to work and live has given school architecture and the children the so-called student center or commons—the living room of the school plant for social development and relaxation.

8. Low Ceilings: Research in lighting and ventilation has led the way to the use of lower and more economical ceilings over better lighted and better ventilated spaces.
9. Renaissance of Top Lighting: Improved lighting techniques, materials and flashing methods allow school buildings to be more economically compact, better lighted and better adapted for maximum flexibility.
10. Landscaping: The acceptance that a successful school plant is more than a building situated in the middle of a city block with a Christmas tree-like plant on each side of a main entrance, has given us beautiful, functional sites with terraces, screens and outdoor teaching spaces, as well as green lawns.
11. Movable Equipment: Another breakthrough for education has been the development of movable furniture and equipment to facilitate the activity concept of learning.
12. Humanistic Architecture: More and more school planners have accepted the premise that architecture can help the child to grow and develop mentally, physically, emotionally and socially. They have made a great effort to produce humanistic architecture, resulting in a healthful, functional, non-confining, colorful, warm, friendly environment for children.



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Outdoor areas are an important aspect of the overall design of a school. Chevron brick walls on the playground of the Florence Black Elementary School, Mesquite, Texas, act as windbreaks for the open play area. The all-purpose room at the rear has sliding glass doors to open the area to the outdoors.

CONCLUSIONS:

These breakthroughs and barriers spell out what has been done and what we think needs to be done to give our children and teachers better school plants. To sum it up—the accomplishments are many but our job is by no means complete. We in America are a long way from achieving the best in school architecture. We must continue to break through the barriers which tend to stifle creativity in school architecture.

THESE REPORTS ARE PREPARED IN THE INTEREST OF IMPROVEMENT AND APPRECIATION OF ARCHITECTURE.

RESEARCH REPORT 10

DEVELOPMENT OF A GLASS GYMNASIUM

by WILLIAM W. CAUDILL

LET me tell you how Tyler, Texas, got its glass gymnasium. This is the way it *didn't* happen: *One day as we were cooling off our hot drafting boards, discussing the sad state of the world and agreeing that all problems would be solved if our architects' fees were raised to 10 percent, Lawrence, the brain of the design section, said, "Let's build an all glass gymnasium."* If it did happen like this, tell me, how could such a wild idea be sold to a conservative East Texas School Board?

No, that's not the way it happened. The idea just didn't pop out. It grew out of group action. The new glass gymnasium, probably the first of its kind, was the result of a long and tedious planning process involving at least fifteen architects and engineers and twice that many school administrators and teachers.

When It All Started

Back in May, 1953, was when it all started. The planning of this gymnasium was a part of the planning for a 750-pupil junior high school. It has been the experience of our firm that good school buildings come about when good educators and good architects get together in the planning process. We can't say much about our own firm's quality, but we will certainly speak highly of our architect associates in Tyler, Robert O. Bruce and Charles R. Russell.

The educators' team, one of the best we have ever worked with, was led by Dr. Hollis A. Moore, a superintendent with years of successful administration to his credit, and his two highly capable associates, Dr. Jack Elder and Mrs. Hazel Owens.

When our architects' team got together with the educators' team, things began to pop. What really set off the fireworks, as far as the gymnasium was con-

THE PROBLEM:

Most gymnasiums are dark, dank boxes with holes punched in the sides to let in insufficient quantities of light and air. What is needed is a thorough understanding of the problems involved in providing facilities for physical education, and a fresh approach for solving these problems.

This report concerns how a group of architects and educators came upon just such an understanding and approach.

Here is a typical gymnasium, a big masonry box with a few punched holes to let in light and air.

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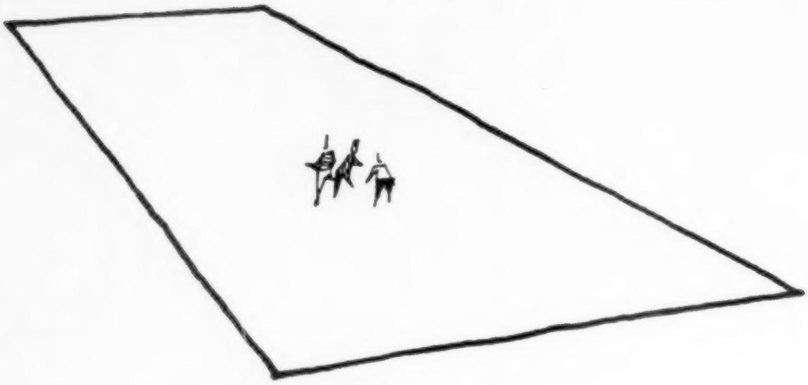

Most school games can best be played outdoors—even during cold days—because active play provides each child with a built-in heating system.

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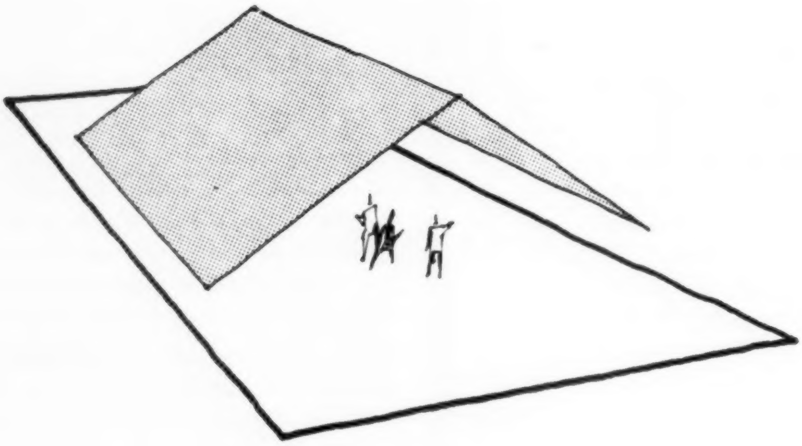


Since rain, snow and sometimes the hot sun may interfere with outdoor play, a roof is needed. And that is all! Such a roof can be inexpensive.

2

cerned, was when one of the principals of an existing junior high school challenged the architects with this statement, "Whatever we do, don't let's build the gymnasium like the one we have now." Yet the one he had was the same type being built all over the nation—a large brick box with high whitewashed windows on at least one side, and adjacent dressing and locker rooms.

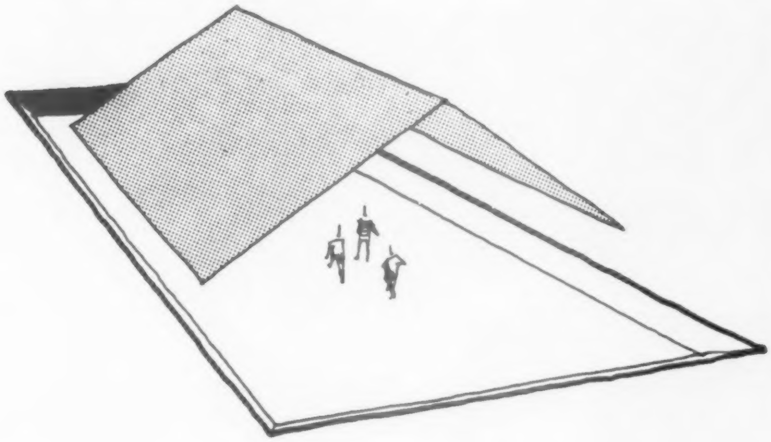
Mistakes of the Past

This principal, Bob Burns, spoke about the way his gymnasium smelled and said there was not enough light or ventilation. He talked of how hot the gymnasium got during the early fall and late spring months. He said that the reason the windows had been whitewashed was to keep the sun off the playing court.

This discussion by Mr. Burns triggered off more complaints by Al Martin, our partner and engineer. He discussed how impractical it was to build large masses of masonry. He said that to build these large brick boxes was simply to invite structural cracks. He also pointed out that high brick walls were expensive as well as being susceptible to cracks.

Then William Peña, another partner, who has a strong interest in ventilation, told how wrong it was to put windows high up on the walls so that the cool, prevailing breeze went over the children's heads instead of flowing down to the playing zone where it could do the most good.

One thing led to another. Why do most gymnasiums smell? After much discussion the simple truth came out. When dressing rooms adjoin the gymnasium, inadvertently the odors and humidity of the dressing room pass into the gymnasium. Any box which needs to be ventilated, whether a dressing room or classroom,



Some school games need high ceilings. Instead of building the structure upward, it seems feasible to dig downward to get the extra height.

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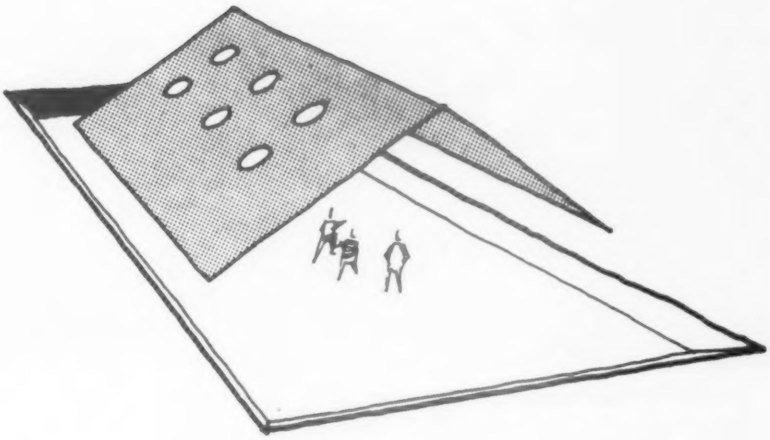


When the roof is intended to cover an extensive area, the light in the interior space may prove to be inadequate. To admit the needed light, plastic bubble skylights are added.

4

must have openings on at least two sides—openings on one side to let the air in and on the other to let it out.

Faulty Ventilation

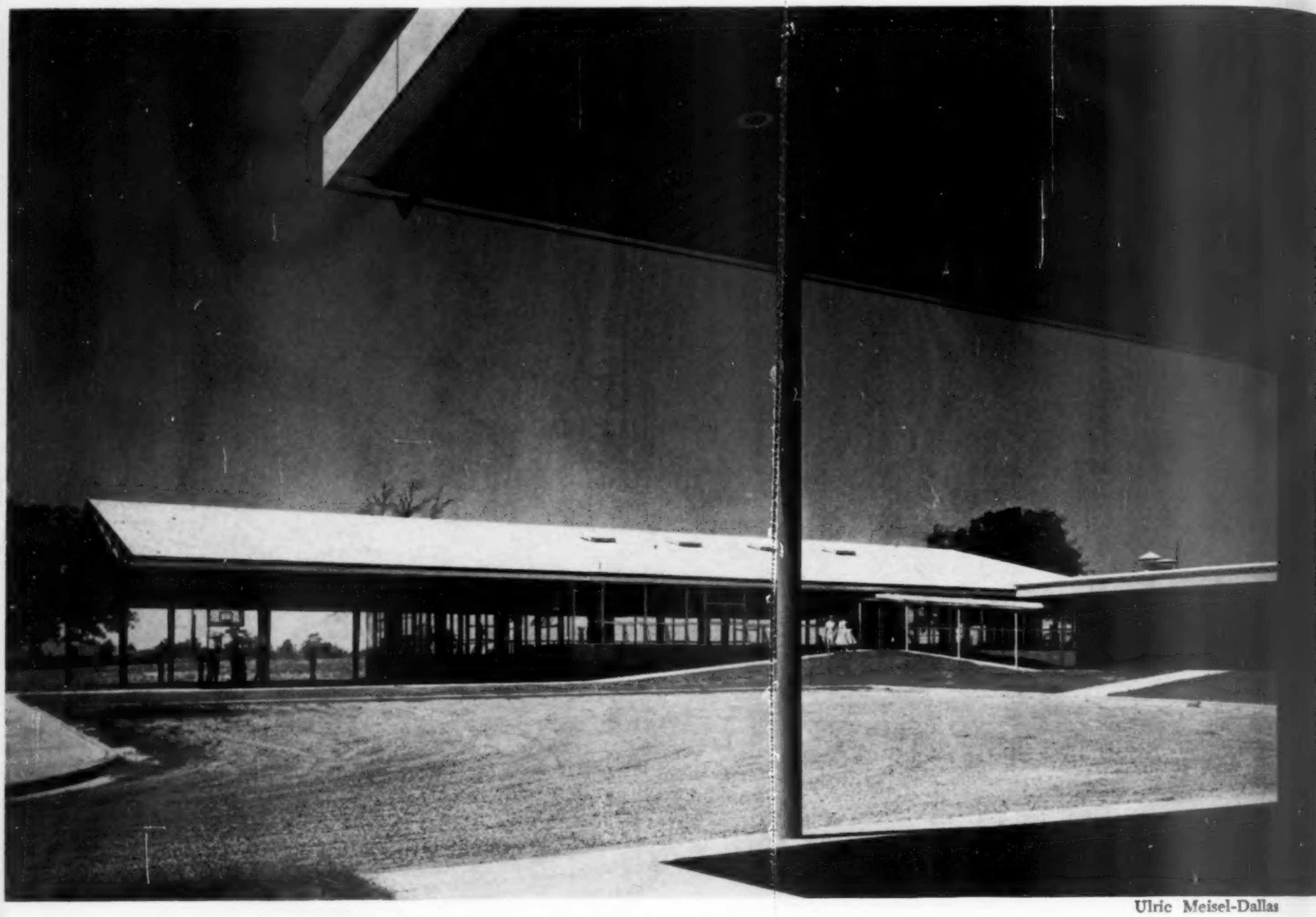
The typical dressing room, located adjacent to the gymnasium, generally has its outside windows oriented to catch the breeze. Since the opposite side contains the doors from the dressing rooms to the gymnasium, the only place where the air can flow is from the dressing rooms to the gymnasium. No wonder gymnasiums smell.

The situation would be relieved somewhat if the gymnasium had the kind of windows which allow cross ventilation at the playing floor. Unfortunately, in most cases, the cross ventilation is only at the ceiling and creates a large slow eddy in which smells and humidified air are trapped.

Everyone on the architects-educators planning team agreed that the conventional gymnasium certainly was not the solution to the problem of indoor game activity. After a great deal of discussion on the kind of environment needed for physical education, the planners concluded that most games can best be played outdoors, even during cold days, because active play provides each child with a built-in heating system. They agreed that since rain, snow and sometimes the hot sun interfere with outdoor play, only a roof was needed. And that was all.

A Play Shed Arrangement

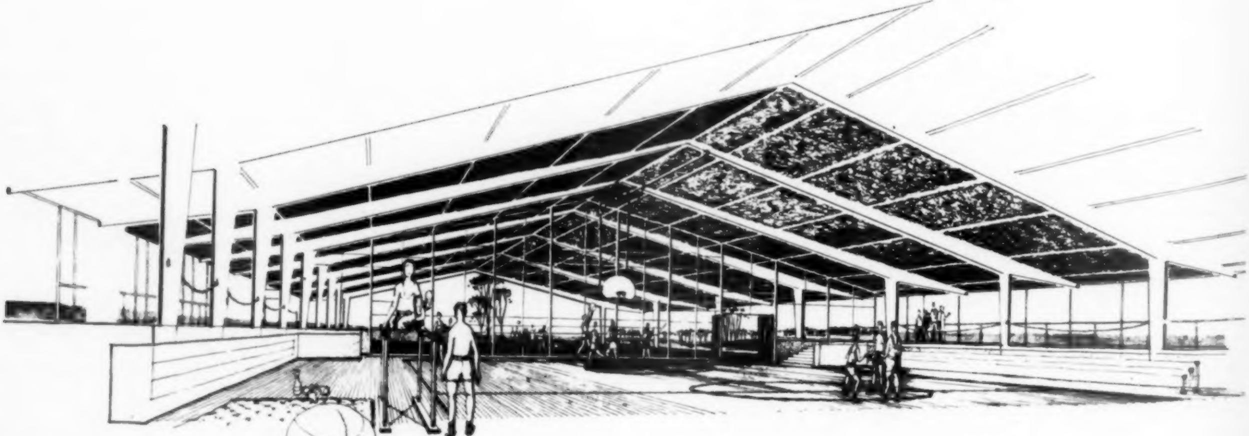
The planners recognized, too, that there were some days during the year when the temperature was so low that even in active play children would be cold. Some sort of thermal screen was necessary. But each member of the team agreed that these cold periods were of short



Ulric Meisel-Dallas

The glass-enclosed gymnasium is an important part of the Moore Junior High School in Tyler, Texas. A covered play court is at the left; two glassed-in play courts are at the right.

To assure comfortable game space during the cold months of the year, the play shed is glassed in. An indoor play court is then created which is "about as nice as an outdoor one."



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Ulric Meisel—Dallas

The Tyler, Texas, gymnasium is actually a play court which has been glassed in. An open play court extends beyond the glass wall of the gymnasium proper.

duration, probably no more than 10 percent of the school year. With the exception of a few individual members, the group felt that perhaps a very logical solution to the problem was simply to build a large roof over a playing court, in a play shed arrangement.

The feasibility of the playing shed was discussed considerably. Most of the planning group thought that it would serve the physical education program adequately. They believed that, during those days when it is too cold to play on the court, the program could be modified, without a great loss to the total program, by having health classes. The P.E. people, however, wanted to run a regular schedule regardless of the weather.

However, the reason we have a gymnasium instead of a playing shed is because we lacked the strength of our convictions. We were afraid of public reaction. We were afraid someone might say, "Whoever heard of a junior high school without a gymnasium?" "Imagine, just a roof!" "My kid will catch his death of cold." Most of us were afraid of that kind of criticism, despite the fact that we knew that a play shed was a very logical solution to the gymnasium problem. It afforded the best kind of natural light and wonderful ventilation.

The Glassed-In Play Shed

So we decided against the play shed as a substitute for the gymnasium. (However, we did manage to work one playing court under a play shed.) Since the planning group could not summon sufficient courage for its daring idea, someone suggested an alternative, "Why not build a play shed and glass it in?" And that's what we did.

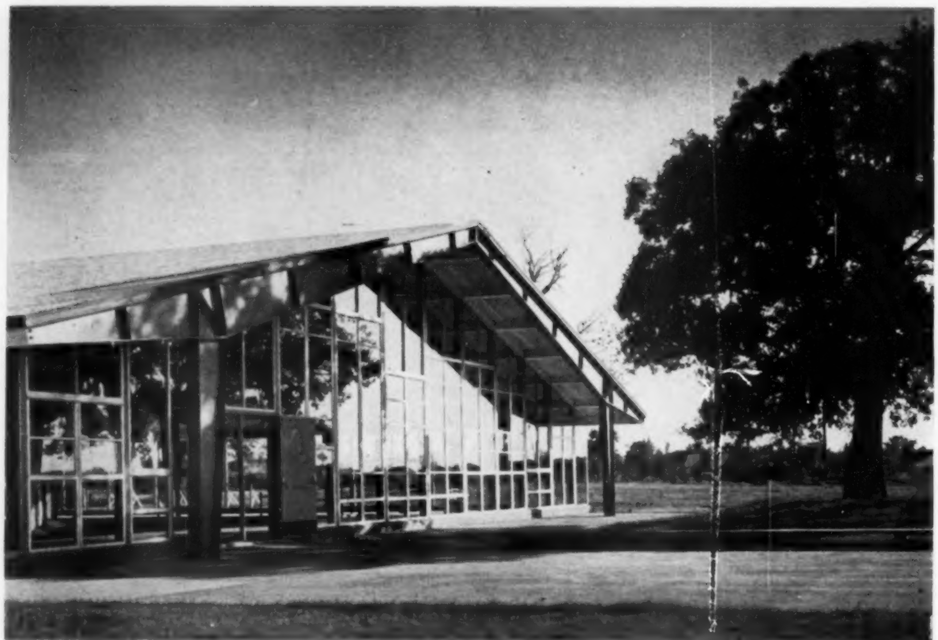
The new Moore Junior High School in Tyler, Texas, has a gymnasium which is really a large roof with glass walls. The glassed-in portion covers two playing courts. The roof is extended out on the south to act as a sun control eyebrow for the inside playing courts, but it also serves as a play shed for the third court.

What the New Gym Is Like

There is not a brick in this building—no high masonry walls to crack. The sloping roof keeps the sun off the glass. This is one gymnasium in which windows will not have to be whitewashed. The careful location of the ventilating sash allows air to come in and go out regardless of what direction the wind is blowing.

This gymnasium not only looks like an outside play court but it smells like one—only clean fresh air. The playing floor is not a ventilating duct for adjacent locker and dressing rooms. These rooms are located about 30 feet away on the leeward side of the building. Overhead plastic skylights and the four-side glass walls light up the interior of the gymnasium so that its high level of illumination approaches that of the outdoors.

Yes, it is truly a play shed, glassed-in. Maybe next time we'll have the courage to build just the play shed. We have one on our drafting boards now for a school in



The Moore Junior High School gymnasium is open to the countryside through the media of its glass walls. The whole structure has no resemblance to the expensive brick boxes which have been and are still being designed for use as school gymnasiums.

Ulric-Meisel—Dallas

South Texas. We understand that R. L. Williams, superintendent of schools at Corpus Christi, has some successful play sheds working at the secondary level. We also found out that a very fine parochial school in New Orleans has a play shed that serves as a gymnasium. Superintendent Bob Ashworth, in Kilgore, Texas, has built play sheds on all of the elementary campuses and, as far as we know, they have worked. Also, special mention is made of pioneering work by architects Perkins and Will in the development of glass wall playrooms.

The Solution Is Accepted

The new concept that a good gymnasium might be a glassed-in play shed has led not only to a very economical solution for a difficult problem, but also to a solution highly accepted by children and the community alike. First consider the children, because there we have the real yardstick for measuring the value of this thing of ours. Ed Irons, the able principal of this school, says that he can't keep the children out of the gymnasium, and the nicest thing about Ed is that he doesn't try. He says that even on Sundays there will be 50 to 75 children playing in and around the gymnasium. How wonderful it is for a principal to feel that he should open up his school to the youngsters all week long.

During our planning stage we underestimated the people, too. Some of us were scared to death that the "people" would criticize even to the point of not accepting this new type of gymnasium. In fact, the school board members themselves had more convictions about this all glass gymnasium than the planning group which originated the idea. Some members of the planning group were ready to back out at the last minute and, if it weren't for the insistence of the school board members that we go ahead and develop the idea to the fullest, we would probably have ended up with a not so good compromise.

The Nicest Features of the School

The Moore Junior High School has many interesting features—back-to-back step down classrooms, decentralized heating; and others. But most people think that the all glass gymnasium, with its separated dressing and locker rooms, is the nicest feature. All of us on the planning team remember, however, that the gymnasium was the hardest thing to sell to ourselves when we first saw the sketches.

Now that this is over, I can't help but remember what one teacher said when we first started talking about the problems of housing physical education. This is pretty close to her exact words, "Wouldn't it be nice if we could make an indoor playing court which would be as nice as an outdoor one." Many people feel that the Moore Junior High School gymnasium is just that.

MANUFACTURERS' PRODUCT INDEX

Index of products that are shown in Product Catalog File Volume II American School and University, 28th Edition.

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Inland Steel Products Company B32
Johns-Manville B19-22

Baskets—Waste (see Receptacles—Waste)

Baskets—Wire

Interior Steel Equipment Co. F47
Pacific Shaw Company G4/Pa

Batteries

Exide Industrial Div., Electric Storage Battery Co. C38
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Beach Equipment

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Benches—Seating

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Grogg Bros. Mfg. Co. D36
Haldeman-Homme Mfg. Co. E1/Ha
Howe Folding Furniture, Inc. D38
Metwood Mfg. Co. D3/Me
Mitchell Manufacturing Co. D42-44
Penco Metal Products F4/Pe
Rol-Fol Table Inc. E1/Ro (49)
Schieber Sales Company E1/Sc
Seat-Eat Incorporated E12, 13
Sico Manufacturing Co. Inc. E14

Benches—Work

Educators Manufacturing Co. D39
Interior Steel Equipment Co. F47
Kewaunee Manufacturing Co. F2/Ke
Laboratory Furniture Co., Inc. F2/La
Lyon Metal Products, Incorporated F48, 49
Metalab Equipment Corp. F2/Me
Mutschler Brothers Company E3/Mu
Stacor Equipment Co. F3/St
Standard Pressed Steel Co. F20
Tolerton Company F3/To

Bicycle Racks

American Playground Device Company G29
Everwear Manufacturing Co., Inc. ... G30
General Playground Equipment, Inc. . G32

Binding Materials—Book

Holliston Mills, Inc. D60

Bins for Small Parts—Shop

Interior Steel Equipment Co. F47
Lyon Metal Products, Incorporated F48, 49

Biology Cases

Kewaunee Manufacturing Co. F2/Ke
Laboratory Furniture Co., Inc. F2/La
Metalab Equipment Corp. F2/Me

Bits and Braces

Greenlee Tool Co. F21
Millers Falls Company F23
Stanley Tools F24

Blackboards (see Chalkboards)

Bleachers and Grandstands—Folding & Permanent

American Bridge (Div. United States Steel Corporation) G7
Berlin Chapman Company G1/Be
Castadia Inc. G8
Horn Div., Brunswick-Balke-Collender Co. G1/Ho
Hussey Mfg. Co., Inc. G9
Medart Products, Inc., Fred G10, 11
Pittsburgh-Des Moines Steel Co. G12
Playtime Equipment Corp. G13
Safway Steel Products, Inc. G14
Snyder Tank Corporation G15
Universal Bleacher Company G18
Wayne Iron Works G16, 17

Bleaching & Sterilizing Solutions

Olin Mathieson Chemical Corporation G22

Blinds—Venetian

Kirsch Company A6/Ki
Levolor Lorentzen, Inc. A6/Le
Rowles Co. B34

Blocks—Glass (see Glass Block)

Boards—Bulletin & Directory (see Bulletin Boards)

Boiler Cleaners—Vacuum

Kent Company, Inc. H12
Multi-Clean Products, Inc. H1/Mu
Spencer Turbine Company H14
United Floor Machine Company, Inc.. H15

Boilers—Heating System

Babcock & Wilcox Company C9
International Boiler Works Co. C14
Orr & Sembower, Inc. C22
Petro C16, 17
Smith Co., Inc., H. B. C1/Sm
Titusville Iron Works, Div. Struthers Wells Corp. C18, 19

Bolts—Fire & Panic

Vonnegut Hardware Co., Von Duprin Div. B45

Book Binding Materials

Holliston Mills, Inc. D60

Book Cases, Cabinets & Racks

All-Steel Equipment Inc. D5/Al
Art Metal Construction Co. D5/Ar
Borroughs Manufacturing Company . D50
Brunswick-Balke-Collender Co. ... D3/Br
Colonial Engineering Co., Inc. D3/Co
Coppes, Inc. E3/Co
Educators Manufacturing Co. D39
General Fireproofing Company .. D5/Ge
Geneva Modern Kitchens E3/Gen
Globe-Wernicke Co. D54, 55
Interior Steel Equipment Co. F47
Kewaunee Manufacturing Co. F2/Ke
Moduwall, Inc. B6/Mo
Mutschler Brothers Company E3/Mu
National School Furniture Company D3/NaS
Penco Metal Products F4/Pe
Remington Rand Inc. D58, 59
Simmons Company E30, 31
Star Steel Equipment Co., Inc. F26
Tolerton Company F3/To
Valverde Company, Inc. D4/Va
Wood-Metal Industries, Inc. E29

Bookkeeping Machines

National Cash Register Company ... D57
Remington Rand Inc. D58, 59

Book Shelving & Stacks

Art Metal Construction Co. D5/Ar
Borroughs Manufacturing Company . D50
Educators Manufacturing Co. D39
General Fireproofing Company ... D5/Ge
Globe-Wernicke Co. D54, 55
Interior Steel Equipment Co. F47
Kewaunee Manufacturing Co. ... F2/Ke
Remington Rand Inc. D58, 59
Star Steel Equipment Co., Inc. F26
Valverde Company, Inc. D4/Va

Book Trucks (see Carts)

Bottled Shaker—Laboratory

United States Stoneware Co. F17

Bowls—Kitchen

Boonton Molding Company E5
Corning Glass Works E6, 7
Keyes Fibre Company E9
Prolon (Div. Pro-phy-lac-tic Brush Co.) E11

Box Lockers (see Lockers)

Boxes—Metal, Shop (see Bins)

Casements—Door & Window

General Bronze Corporation A4/Ge
Marmet Corporation A4/Ma

Cases—Museum & Display

Claridge Products & Equipment, Inc. . B31
Coppes, Inc. E3/Co
General Fireproofing Company ... D5/Ge
Geneva Modern Kitchens E3/Gen
Kewaunee Manufacturing Co. F2/Ke
Laboratory Furniture Co., Inc. F2/La
Metalab Equipment Corp. F2/Me
Michaels Art Bronze Co., Inc. B46
Moduwall, Inc. B6/Mo
Mutschler Brothers Company E3/Mu
Remington Rand Inc. D58, 59
Star Steel Equipment Co. Inc. F26

Cash Registers

National Cash Register Company D57

Casters

Bassick Company D3/Ba
Faultless Caster Corporation D35
Nutting Truck and Caster Co E20

Caulking Compounds & Cement Seals

Hillyard Chemical Company H1/Hi
Horn Corporation, A. C. A8/Ho
Legge Company, Inc. H13
Multi-Clean Products, Inc. H1/Mu

Ceiling Slabs

Insulrock Company A18

Ceiling Tile (see Tile—Acoustical)

Ceiling & Floor Structure

Laclede Steel Company A12
Natco Corporation B18

Ceilings—Acoustical (see Acoustical Materials)

Ceramic Furnaces (see Furnaces for Ceramics & Metals)

Chair-Desk Combination

American Desk Manufacturing Co. D3/AmD
American Seating Company D3/AmS
Arlington Seating Company D32, 33
Brunswick-Balke-Collender Co. .. D3/BBC
General Fireproofing Company ... D5/Ge
Griggs Equipment Company D3/Gr
Ideal Seating Company D3/Id
Irwin Seating Company D41
Kuehne Manufacturing Co. D3/Ku
Norcor Manufacturing Company, Inc. . D46
Rowles Co. D47
Shwayder Bros., Inc. D3/Sh
Virco Mfg. Corporation D3/Vi
Westfield Manufacturing Company . D3/Col
Westmoreland Metal Mfg. Corp. .. D3/We
Williams & Brower, Inc. D48

Chair Glides & Casters

Bassick Company D3/Ba
Buckeye Glide Co., Inc. D34
Faultless Caster Corporation D35

Chair Rail

Inland Steel Products Company B32

Chair Trucks (see Trucks—Table, Chair, Book, Tool, etc.)

Chairs—Auditorium, Classroom, etc.

American Desk Manufacturing Co. D3/AmD
American Seating Company D3/AmS
Arlington Seating Company D32, 33
Brunswick-Balke-Collender Co. .. D3/BBC
Griggs Equipment Company D3/Gr
Heywood-Wakefield Company D37
Ideal Seating Company D3/Id
Irwin Seating Company D41
Kuehne Manufacturing Co. D3/Ku
National School Furniture Company D3/NaS
Norcor Manufacturing Company, Inc. D46
Rowles Co. D47
Toledo Metal Furniture Company .. D3/To
Virco Mfg. Corporation D3/Vi
Westfield Manufacturing Company . D3/Col
Westmoreland Metal Mfg. Corp. .. D3/We
Williams & Brower, Inc. D48

Chairs—Dormitory

General Fireproofing Company ... D5/Ge
Kuehne Manufacturing Co. D3/Ku
Simmons Company E30, 31
Superior Sleeprite Corp. E32, 33

Chairs—Folding

American Desk Manufacturing Co. D3/AmD
American Seating Company D3/AmS
Brewer-Titchener Corp. D31
Brunswick-Balke-Collender Co. .. D3/BBC
Griggs Equipment Company D3/Gr
Ideal Seating Company D3/Id
Irwin Seating Company D41
Lyon Metal Products, Incorporated F48, 49
Mutschler Brothers Company E3/Mu
Norcor Manufacturing Company, Inc. D46
Rowles Co. D47
Rush Stamping Co. D3/Ru
Virco Mfg. Corporation D3/Vi
Westmoreland Metal Mfg. Corp. ..D3/We

Chairs—Life Guard

American Playground Device Company G29
Everwear Manufacturing Co., Inc. ... G30
General Playground Equipment Inc. . G32

Chairs—Office & Library

American Desk Manufacturing Co. D3/AmD
All-Steel Equipment Inc. D5/Al
American Seating Company ... D3/AmS
Arlington Seating Company D32, 33
Art Metal Construction Co. D5/Ar
Brunswick-Balke-Collender Co. .. D3/BBC
General Fireproofing Company ... D5/Ge
Griggs Equipment Company D3/Gr
Heywood-Wakefield Company D37
Ideal Seating Company D3/Id
Irwin Seating Company D41
Kuehne Manufacturing Co. D3/Ku
National School Furniture Company D3/NaS
Norcor Manufacturing Company, Inc. . D46
Standard Pressed Steel Co. F20
Toledo Metal Furniture Company . D3/To
Tolerton Company F3/To
Valverde Company, Inc. D4/Va
Virco Mfg. Corporation D3/Vi
Westfield Manufacturing Company . D3/Col
Westmoreland Metal Mfg. Corp. .. D3/We
Williams & Brower, Inc. D48

Chairs—Stack

Brunswick-Balke-Collender Co. .. D3/BBC
Cowan Products Co., Inc. D3/Cow
Rowles Co. D47

Chairs—Stadium

American Desk Manufacturing Co. D3/AmD
American Seating Company D3/AmS
Ideal Seating Company D3/Id

Chairs—Tablet Arm

American Desk Manufacturing Co. D3/AmD
American Seating Company D3/AmS
Arlington Seating Company D32, 33
Brunswick-Balke-Collender Co. .. D3/BBC
General Fireproofing Company ... D5/Ge
Griggs Equipment Company D3/Gr
Ideal Seating Company D3/Id
Irwin Seating Company D41
Kuehne Manufacturing Co. D3/Ku
National School Furniture Company D3/NaS
Norcor Manufacturing Company D46
Rowles Co. D47
Shwayder Bros., Inc. D3/Sh
Toledo Metal Furniture Company .. D3/To
Virco Mfg. Corporation D3/Vi
Westfield Manufacturing Company . D3/Col
Westmoreland Metal Mfg. Corp. . D3/We
Williams & Brower, Inc. D48

Chalkboard Eraser Cleaners—Vacuum

Spencer Turbine Company H14

Chalkboard Troughs & Trim

Claridge Products & Equipment, Inc. . B31
Inland Steel Products Company B32
Rowles Co. B34
United States Plywood Corporation .. B35

Chalkboards

Bangor Cork Co. B30
Claridge Products & Equipment, Inc. . B31
Geneva Modern Kitchens E3/Gen
Laboratory Furniture Co., Inc. F2/La
Moduwall, Inc. B6/Mo
Pennsylvania Slate Producers Guild Inc. B33
Rowles Co. B34
United States Plywood Corporation .. B35
Vogel-Peterson Company D3/Vo

Chalkboards—Magnet

Moduwall, Inc. B6/Mo
United States Plywood Corporation .. B35

Chalkboards—Reversible

Cowan Products Co., Inc. D3/Cow

Cycloramas

Automatic Devices Company D19
Knoxville Scenic Studios, Inc. D17
Mitchell Industries, Hubert D2/Mi
Novelty Scenic Studios, Inc. D2/No
Pittsburgh Stage, Inc. D26
Weiss & Sons, I. D30

Demineralizers—Water

Barnstead Still and Sterilizer Co. F5

Deodorants

Hillyard Chemical Company H1/Hi
Huntington Laboratories, Inc. H1/Hu
Olin Mathieson Chemical Corporation G22

Desk-Chair Combination

American Desk Manufacturing Co. D3/AmD
American Seating Company D3/AmS
Arlington Seating Company D32, 33
Brunswick-Balke-Collender Co. .. D3/BBC
General Fireproofing Company D5/Ge
Griggs Equipment Company D3/Gr
Ideal Seating Company D3/Id
Irwin Seating Company D41
Kuehne Manufacturing Co. D3/Ku
Norcor Manufacturing Company, Inc. . D46
Rowles Co. D47
Shwayder Bros., Inc. D3/Sh
Virco Mfg. Corporation D3/Vi
Westfield Manufacturing Company . D3/Col
Westmoreland Metal Mfg. Corp. .. D3/We
Williams & Brower, Inc. D48

Desk Tops

Fiberesin Plastics Company D3/Fl
Formica Company D40
Johnson Plastic Tops, Inc. D3/Jo
National School Furniture Company D3/NaS

Desks—Charging

Art Metal Construction Co. D5/Ar
General Fireproofing Company ... D5/Ge
Globe-Wernicke Co. D54, 55
Haskell, Inc. D5/Ha
Valverde Company, Inc. D4/Va

Desks—Classroom

All-Steel Equipment Inc. D5/Al
American Desk Manufacturing Co. D3/AmD
American Seating Company D3/AmS
Arlington Seating Company D32, 33
Brunswick-Balke-Collender Co. .. D3/BBC
Desks of America, Inc. D3/De
Educators Manufacturing Co. D39
General Fireproofing Company ... D5/Ge
Griggs Equipment Company D3/Gr
Heywood-Wakefield Company D37
Ideal Seating Company D3/Id
Irwin Seating Company D41
Kuehne Manufacturing Co. D3/Ku
National School Furniture Company D3/NaS
Norcor Manufacturing Company, Inc. . D46
Rowles Co. D47
Shwayder Bros., Inc. D3/Sh
Toledo Metal Furniture Company .. D3/To
Virco Mfg. Corporation D3/Vi
Westfield Manufacturing Company . D3/Col
Westmoreland Metal Mfg. Corp. .. D3/We
Williams & Brower, Inc. D48

Desks—Dormitory

American Desk Manufacturing Co. D3/AmD
General Fireproofing Company ... D5/Ge
Kuehne Manufacturing Co. D3/Ku
National School Furniture Company D3/NaS
Simmons Company E30, 31
Superior Sleeprite Corp. E32, 33

Desks—Instructors'

All-Steel Equipment Inc. D5/Al
American Desk Manufacturing Co. D3/AmD
Art Metal Construction Co. D5/Ar
Educators Manufacturing Co. D39
General Fireproofing Company ... D5/Ge
Kewaunee Manufacturing Co. F2/Ke
Kuehne Manufacturing Co. D3/Ku
Laboratory Furniture Co., Inc. F2/La
Metalab Equipment Corp. F2/Me
Mutschler Brothers Company E3/Mu
Rowles Co. D47
Shwayder Bros., Inc. D3/Sh
Tolerton Company F3/To
Westmoreland Metal Mfg. Corp. . D3/We

Desks—Office

All-Steel Equipment Inc. D5/Al
American Desk Manufacturing Co. D3/AmD
Art Metal Construction Co. D5/Ar
General Fireproofing Company ... D5/Ge
Globe-Wernicke Co. D54, 55
Haskell, Inc. D5/Ha
Kuehne Manufacturing Co. D3/Ku
Remington Rand Inc. D58, 59
Rowles Co. D47

Desks—Stack

Brunswick-Balke-Collender Co. ... D3/BBC
Kuehne Manufacturing Co. D3/Ku
Rowles Co. D47

Desks—Typewriter (see Typewriter Desks)

Destructors—Garbage & Waste

Morse Boulger Destructor Co. C25

Detergents

Hillyard Chemical Company H1/Hi
Huntington Laboratories Inc. H1/Hu
Legge Company, Inc. H13
Olin Mathieson Chemical Corporation G22

Dimmers—Auditorium & Stage

Adam Electric Co., Frank D20, 21
Capitol Stage Lighting Co., Inc. D22
Century Lighting, Inc. D2/Ce
Federal Pacific Electric Company F10
General Electric Company C6/GE
Kliegl Bros. D24, 25
Lumi-Tron Div., Metropolitan Electric Mfg. Co. D23
Major Equipment Company D18
Mitchell Industries, Hubert D2/Mi
Rol-Fol Table Inc. E1/Ro (49)
Ward Leonard Electric Company D29
Weiss & Sons, I. D30

Dining Hall Equipment

Boonton Molding Company E5
Corning Glass Works E6, 7
Keyes Fibre Company E9
National School Furniture Company D3/NaS
Prolon (Div. Pro-phy-lac-tic Brush Co.) E11
Schieber Sales Company E1/Sc

Directories (see Bulletin & Directory Boards)

Discs—Recording

Presto Recording Corporation D15

Dish Scrapper

Universal Dishwashing Machinery Co. E23

Dishes

Boonton Molding Company E5
Corning Glass Works E6, 7
Keyes Fibre Company E9
Prolon (Div. Pro-phy-lac-tic Brush Co.) E11

Dishwashing Machines

Universal Dishwashing Machinery Co. E23

Disinfectants

Hillyard Chemical Company H1/Hi
Huntington Laboratories Inc. H1/Hu
Olin Mathieson Chemical Corporation G22

Dispensers—Soap (see Soap Dispensers)

Display Cases (see Cases—Museum & Display)

Diving Boards

American Playground Device Company G29
Everwear Manufacturing Co., Inc. ... G30
General Playground Equipment, Inc. . G32
Hussey Mfg. Co., Inc. G9

Domestic Science Equipment (see Homemaking Furniture & Equipment)

Door Closers

Dor-O-Matic Div., Republic Industries, Inc. B42
Glynn-Johnson Corporation B9/Gl
Norton Door Closers B48
Rixson Co., Oscar C. B9/Ri
Yale & Towne Mfg. Company B9/Ya

Door Kicks & Push Plates

Michaels Art Bronze Co., Inc. B46

Door Locks

Dudley Lock Corporation F52
Master Lock Company F53
National Lock Company F54
Yale & Towne Mfg. Company B9/Ya

Door Pulls & Bars

Michaels Art Bronze Co., Inc. B46
Yale & Towne Mfg. Company B9/Ya

Door Saddles & Sills

Accurate Metal Weather Strip Co., Inc. A35
Alberene Stone Corp. of Virginia A11

Generators

Glass Block for Windows and Walls

Glass—Insulating

Glass—Plate

Glass—Structural

Glass Structures

Glass Washing Machines

Glass—Wire

Glasses—Drinking

Glazed Tile

Glides—Chair

Grandstands

Greenhouses

Grilles—Metal Rolling

Grilles—Ornamental

Grills & Griddles

Grinding Tools & Machines

Guards—Window (see Window Guards)

Gymnasium Equipment

Gymnasium Floor Maintenance

Gymnasium Flooring

Gymnasium Lighting

Gymnasium Lockers (see Lockers)

Gymnasium Seating

Hack Saws, Blades & Frames

Hammers (see Tools—Hand)

Hand Dryers

Hangers—Lighting Fixture

Hardware

Heating & Ventilating Equipment

Hedge Trimmers—Electric (see Lawn Mowers & Trimmers)

Herbarium Cases

Hinged Lighting Fixtures

Hinges & Latches

Homemaking Furniture & Equipment

Laminated Beams & Arches
Rilco Laminated Products, Inc. .. A16, 17

Laminated Plastics for Desk Tops, etc. (see Plastics—Laminated)

Lamps—Fluorescent
General Electric Company C6

Lamps—Incandescent
General Electric Company C6/GE

Lamps—Microscope
American Optical Company F6, 7

Lath—Metal
Inland Steel Products Company B32
Truscon Steel Div., Republic Steel A30, 31

Lathes—Machine Shop
Atlas Press Company F26, 27
Boice-Crane Company F28
Brown & Sharpe Mfg. Co. F29-32
Cincinnati Lathe & Tool Co. F34, 35
Duro Metal Products Company F33
LeBlond Machine Tool Company F36
Logan Engineering Co. F39
Niagara Machine & Tool Works F40
Oliver Machinery Company F41
Sheldon Machine Co., Inc. F3/Sh
South Bend Lathe Works F3/So (50)
Walker-Turner Incorporated F44, 45

Lathes—Metal Spinning
Oliver Machinery Company F41

Laundry Bleaching & Sterilizing Solution
Olin Mathieson Chemical Corporation G22

Lavatories & Fixtures
Church Mfg. Company, C. F. C4/Ch
Crane Co. C28, 29

Lawn Mowers & Trimmers
General Playground Equipment Inc. .. G32
Gravely Tractors, Incorporated H20

Leaf Pickup & Mill
Gravely Tractors, Incorporated H20

Lecterns
American Desk Manufacturing Co. D3/AmD

Letter Boxes
Corbin Wood Products Div. (American Hardware Corporation) D51
Federal Equipment Company D56

Letters & Signs
Kutch Co., Walter E. B10/Ku
Michaels Art Bronze Co., Inc. B46
Spencer Industries, Inc. B47

Library Furniture (see Furniture—Office & Library)

Life Guard Chairs (see Chairs—Life Guard)

Lighting—Stage
Adam Electric Co., Frank D20, 21
Capitol Stage Lighting Co., Inc. D22
Century Lighting, Inc. D2/Ce
General Electric Company C6/GE
Kliegl Bros. D24, 25
Knoxville Scenic Studios, Inc. D17
Lumi-Tron Div., Metropolitan Electric Mfg. Co. D23
Major Equipment Company D18
Mitchell Industries, Hubert D2/Mi
Novelty Scenic Studios, Inc. D2/No
Pittsburgh Stage, Inc. D26
Strong Electric Corporation D27
Ward Leonard Electric Company D29
Weiss & Sons, I. D30

Lighting Control (see Switches & Panel Boards—Lighting Control)

Lighting Fixtures—Fluorescent
Curtis Lighting, Inc. C5/Cu
Graybar Electric Company, Inc. C34
Guth Company, Edwin F. C35
Holophane Company, Inc. C36, 37
Sunbeam Lighting Company C5/Su

Lighting Fixtures—Incandescent
Curtis Lighting, Inc. C5/Cu
Graybar Electric Company, Inc. C34
Guth Company, Edwin F. C35
Holophane Company, Inc. C36, 37
Sunbeam Lighting Company C5/Su

Lighting Fixtures—Recessed
Curtis Lighting, Inc. C5/Cu
Guth Company, Edwin F. C35
Holophane Company, Inc. C36, 37

Lighting Reflectors (see Reflectors—Lighting)

Lighting Standards (see Outdoor Lighting Standards)

Lighting Systems
General Electric Company C6/GE

Lighting Systems—Emergency
Exide Industrial Div., Electric Storage Battery Co. C38
Onan & Sons, Inc., D. W. C39

Light-Proof Shade Cloth
Columbus Coated Fabrics Corporation A35
Forse Manufacturing Company A34
Joanna Western Mills Company .. A5/Jo

Liquid Soaps & Dispensers (see Soaps & Dispensers)

Lock Mail Boxes
Corbin Wood Products Div. (American Hardware Corporation) D51
Federal Equipment Co. D56

Locker Locks (see Locks)

Lockers
All-Steel Equipment Inc. D5/Al
General Fireproofing Company ... D5/Ge
Interior Steel Equipment Co. ... B40, F47
Lyon Metal Products, Incorporated F48, 49
Medart Products, Inc., Fred F50, 51
Mutschler Brothers Company E3/Mu
Penco Metal Products F4/Pe
Stacor Equipment Co. F3/St
Star Steel Equipment Co., Inc. F26
Tolerton Company F3/To
Vogel-Peterson Company D3/Vo

Locks—Combination & Key
Dudley Lock Corporation F52
Master Lock Company F53
National Lock Company F54
Yale & Towne Mfg. Company B9/Ya

Longspans (see Roof Arches & Construction)

Loudspeakers
Audio Equipment Co., Inc. G23
Newcomb Audio Products Co. ... D1/Ne
Radio Corp. of America D1/RCA
University Loudspeakers, Inc. D16

Lounge Furniture
General Fireproofing Company ... D5/Ge
Simmons Company E30, 31
Superior Sleeprite Corp. E32, 33

Magnifiers
American Optical Company D9

Mail Box Systems
Corbin Wood Products Div. (American Hardware Corporation) D51
Federal Equipment Co. D56

Mail Handling Equipment
Corbin Wood Products Div. (American Hardware Corporation) D51
Federal Equipment Company D56

Map Cloth
Holliston Mills, Inc. D60

Map Rail (see Trim)

Masonry Restoration & Cleaning
Horn Corporation, A. C. A8/Ho

American Mason Safety Tread Co. B14
Inland Steel Products Company B32
Wooster Products, Inc. B17

Silverware

International Silver Company E8
Oneida, Ltd. E10

Sink & Shelf Unit—Classroom

Colonial Engineering Co., Inc. D3/Co
Educators Manufacturing Co. D39

Sinks—Kitchen

Blickman, Inc., S. E15
Crane Co. C28, 29
Geneva Modern Kitchens E3/Gen
Kewaunee Manufacturing Co. F2/Ke
Lyon Metal Products, Incorporated F48, 49
Van Range Co., John E25

Sinks—Laboratory

Alberene Stone Corp. of Virginia F15
Kewaunee Manufacturing Co. F2/Ke
Knight, Maurice A. F16
Laboratory Furniture Co., Inc. F2/La
Metalab Equipment Corp. F2/Me
Tolerton Company F3/To
United States Stoneware Co. F17

Sinks—Lavatory

Crane Co. C28, 29

Skylights

Kimble Glass Co., Owens-Illinois . A20, 21
Mississippi Glass Company A3/Mi
Pittsburgh Corning Corporation A19

Slate Chalkboards

Pennsylvania Slate Producers Guild, Inc. B33

Slide Films (see Films, Film Slides, Film Strips)

Slide Projectors (see Projectors—Slide & Film)

Slides—Playground

American Playground Device Company G29
Everwear Manufacturing Co., Inc. .. G30
General Playground Equipment Inc. .. G32
Porta-Play G3/Po

Snow Removal Equipment

Gravely Tractors, Incorporated H20

Soaps

Hillyard Chemical Company H1/Hi
Huntington Laboratories, Inc. H1/Hu

Soapstone

Alberene Stone Corp. of Virginia A11

Sound Deadening Materials (see Acoustical Materials)

Sound Systems

Bogen Company, Inc., David D12, 13
Edwards Company, Inc. C40, 41
Graybar Electric Company, Inc. C34
Radio Corp. of America D1/RCA
University Loudspeakers, Inc. D16

Spectrographic Equipment

American Optical Company F6, 7

Sports Timing Equipment

All-American Scoreboard Corp. G19
Brown Company, M. D. G20
Ducommun Company, M. G24
Game-Time, Inc. G31
Medart Products, Inc., Fred G10, 11
Naden & Sons Electric Scoreboard Co. B89

Spotlights

Capitol Stage Lighting Co., Inc. D22
Century Lighting, Inc. D2/Ce
Kliegl Bros. D24, 25
Lumi-Tron Div., Metropolitan Electric Mfg. Co. D23
Mitchell Industries, Hubert D2/Mi
Major Equipment Company D18
Novelty Scenic Studios, Inc. D2/No
Pittsburgh Stage, Inc. D26
Strong Electric Corporation D27
Weiss and Sons, I. D30

Sprinklers—Automatic Fire

Grinnell Company C33

Stacks—Book

Art Metal Construction Co. D5/Ar
Borroughs Manufacturing Company .. D50
General Fireproofing Company D5/Ge
Globe-Wernicke Co. D54, 55
Interior Steel Equipment Co. F47
Remington Rand Inc. D58, 59
Star Steel Equipment Co., Inc. F26

Stadium Construction (see Grandstands)

Stadium Seating (see Bleachers & Grandstands)

Stage Curtains (see Curtains & Draperies)

Stage Equipment—Electrical

Adam Electric Co., Frank D20, 21
Century Lighting, Inc. D2/Ce
General Electric Company C6/GE
Kliegl Bros. D24, 25
Knoxville Scenic Studios, Inc. D17
Lumi-Tron Div., Metropolitan Electric Mfg. Co. D23
Major Equipment Company D18
Mitchell Industries, Hubert D2/Mi
Novelty Scenic Studios, Inc. D2/No
Pittsburgh Stage, Inc. D26
Weiss and Sons, I. D30

Stage Equipment, Rigging & Hardware

Automatic Devices Company D19
Knoxville Scenic Studios, Inc. D17
Mitchell Industries, Hubert D2/Mi
Novelty Scenic Studios, Inc. D2/No
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